ORDER NO. ARD-7702013C

Service Manual

Cassette Deck

RS-615US-D

Front-Loading Stereo Cassette Deck with
Dolby* Noise-Reduction System,
Timer Stand-By and 3-Position Tape Selector

RS-630U MECHANISM SERIES

Specifications (Catalog specifications for sales)

Power requirement:	AC; 110/125/220/240V, 50Hz
Power consumption:	10W
Motor:	DC electronic speed control motor
Track system:	4-track, 2-channel stereo recording and playback
Tape speed:	4.8cm/s
Wow and flutter:	0.1% (WRMS), 0.2% (DIN)
Frequency response:	CrO_2 tape; 30~16,000Hz 30~14,000Hz (DIN) Normal tape; 30~14,000Hz 30~13,000Hz (DIN)
Signal-to-noise ratio:	Dolby NR in; 60dB (above 5kHz) Dolby NR out; 50dB (signal level=250nWb/m)
Fast forward and rewind time:	Approx. 90 seconds with C-60 cassette tape
Input:	MIC; sensitivity 0.25mV/applicable microphone impedance 600Ω~20KΩ LINE; sensitivity 60mV/input impedance 47KΩ
Output:	LINE; output level 0.42V/load impedance 50KΩ over HEADPHONES; output level 65mV/load impedance 8Ω
REC/PB connection:	5P DIN type; input level 0.34mV/2.2KΩ output level 0.42V/3.3KΩ
Head:	2-head system; 1-super permalloy head for record/playback 1-ferrite head for erasing
Dimensions:	41.0cm(W)×14.0cm(H)×30.5cm(D)
Weight:	6.3kg

Specifications are subject to change without notice.

National Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

TECHNICAL INFORMATION

TIMER STAND-BY OPERATION MECHANISM

[FUNCTION]

The timer stand-by system which makes unattended timer recording and playback possible by simply adding one of the audio timer.

With the timer ····· it's only necessary to press the pause button, and then the recording and playback buttons. Then set the timer, and the timer turns off the power to the system.

Next, simply release the pause button, and press the timer stand-by button. Then, when the timer later turns on the power, the recording or playback will automatically begin at the same time.

[DETAIL EXPLANATION]

The explanation of this mechanism will be made based on the drawings which are described as shown in fig. 1, 2 and 3.

(1) When the power ON/OFF switch is turned **"OFF" position** (with the timer stand-by button in the **"ON" position**) as shown in fig. 1 and 2.

1. The timer lever-C is pushed in the direction of arrow (①) as shown in fig. 2.
2. The lock plate and the timer lever-C are locked at point (Ⓑ).
3. When the timer lever-C is moved in the direction of arrow (①), timer lever-B and timer lever-A move at the same time in the directions of arrows (②) and (③) and (④) as shown in fig. 1.
   In this condition, the Auto-Stop driving lever assembly and timer lever-A separate. This is because this timer stand-by mechanism is operated during recording or playback, and if the timer lever-A did not separate, the Auto-Stop operation mechanism would function to stop condition the unit.
4. When timer lever-B moves in the direction of arrow (②), the Auto-Stop driving pawl is pulled in the direction of arrow (⑤) by the spring, and therefore, it will move at same time in the direction of arrow (⑥) and become to engage the projection of the takeup idler.

(2) When the power ON/OFF switch is turned **"ON" position** (with the timer stand-by button in the **"ON" position**) as shown in fig. 1 and 2.

1. The motor starts rotating, and the capstan rotates in the direction of arrow (①).
2. Because the capstan contacts the takeup idler it rotates in the direction shown by arrow (②) at the same time when the capstan rotates.
3. When the takeup idler rotates, the Auto-Stop driving pawl is pushed outward in the direction of arrow (③), and the Auto-Stop driving lever assembly functions in direction shown by arrow (④). See fig. 1.
4. The lock plate is released at the same time that part (Ⓐ) of the Auto-Stop driving lever assembly moves toward (④). See fig. 2.
5. Timer lever-C and lever-B return in the direction of arrows (⑤) and (⑥), and timer lever-A also returns in the diretion of arrow (⑦).
6. The unit then becomes in the usual recording or playback condition.

[ORDINARY AUTO-STOP MECHANISM FUNCTION]

The fig. 4 shows the operation order of the ordinary Auto-Stop mechanism.

I. TOP VIEW/TIMER STAND-BY BUTTON IN THE "ON" POSITION

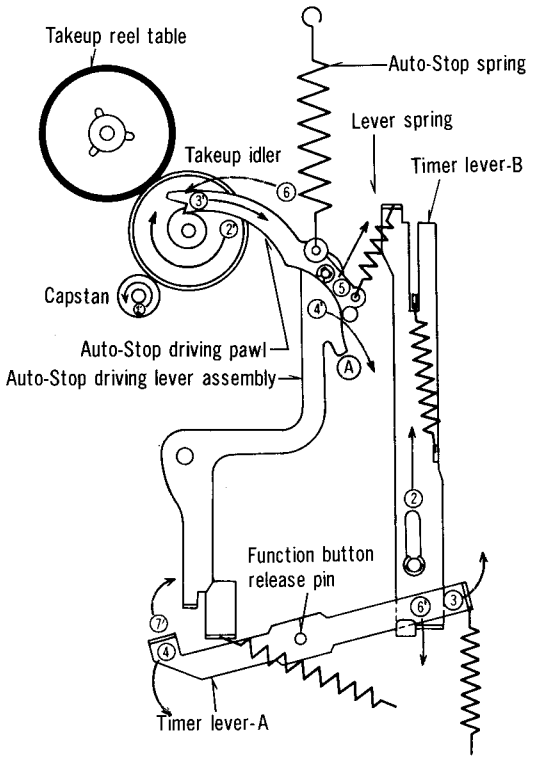


Fig. 1

II. BOTTOM VIEW/TIMER STAND-BY BUTTON IN THE "ON" POSITION

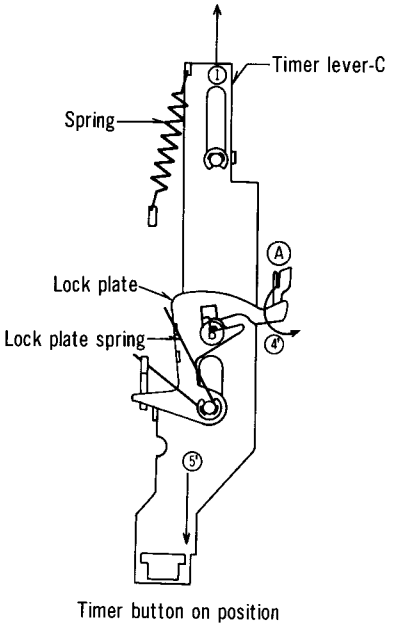


Fig. 2

III. BOTTOM VIEW/TIMER STAND-BY BUTTON IN THE "OFF" POSITION

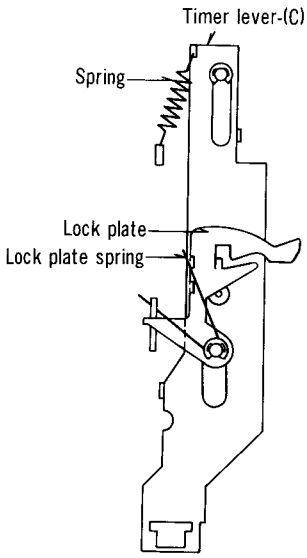


Fig. 3

IV. TOP VIEW/ORDINARY AUTO-STOP MECHANISM

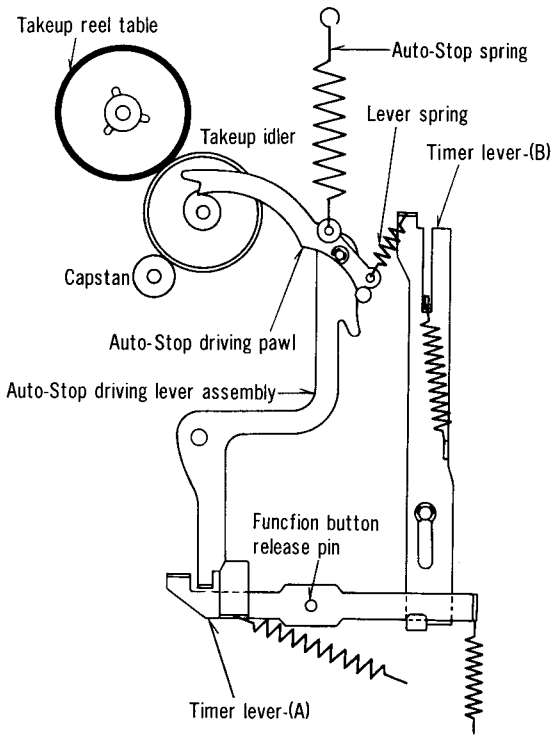


Fig. 4

LOCATION OF CONTROLS AND COMPONENTS

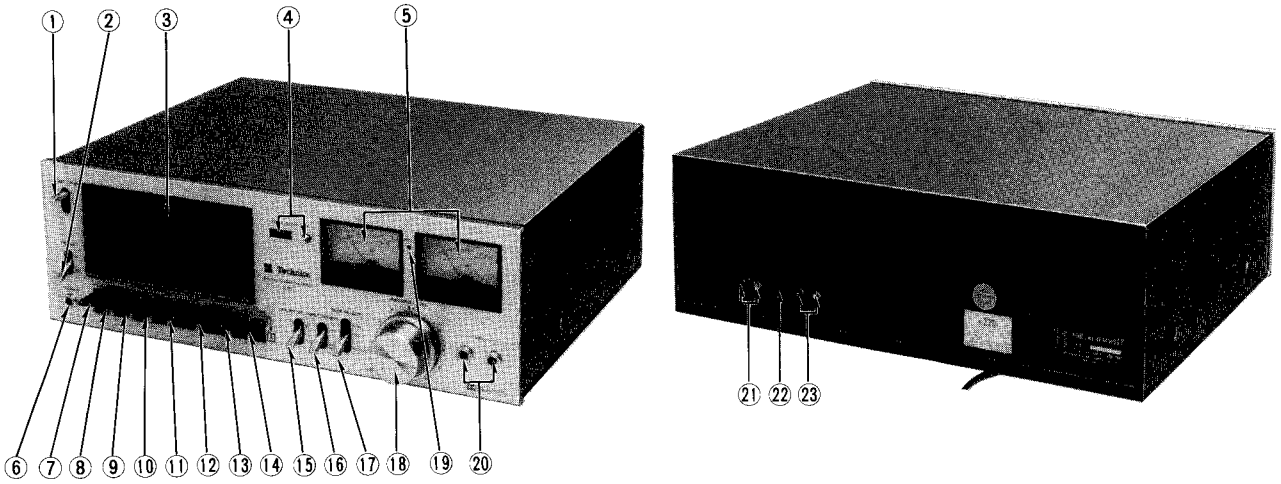


Fig. 5

① Door open lever
② Power switch
③ Cassette compartment door
④ Tape counter and reset button
⑤ Level/VU meters
⑥ Headphones jack
⑦ Eject button
⑧ Record button
⑨ Rewind button
⑩ Fast forward button
⑪ Playback button
⑫ Stop button
⑬ Pause button
⑭ Timer stand-by button
⑮ Dolby noise-reduction switch
⑯ Input selector
⑰ Taps selector
⑱ Record level adjustment
⑲ Recording indication lamp
⑳ Microphone jacks
㉑ Line output jacks
㉒ Record/playback connection socket
㉓ Line input jacks

DISASSEMBLY INSTRUCTIONS

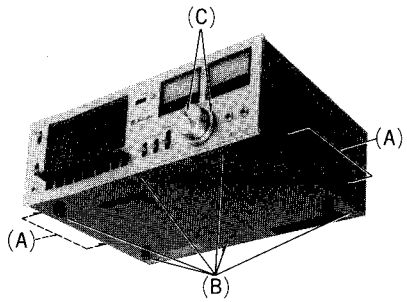


Fig. 6

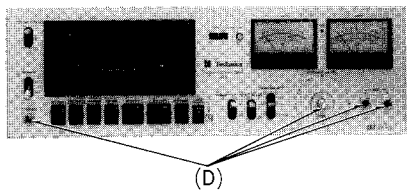


Fig. 7

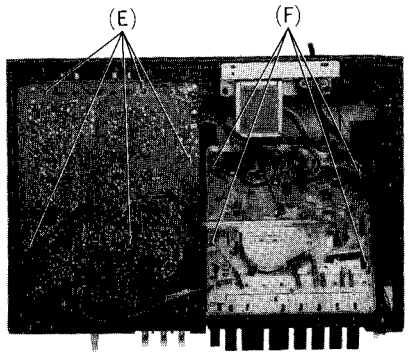


Fig. 8

Procedure	To remove ——.	Remove ——.	Pcs.	Shown in fig. ——.
1	Case cover	(A)	(4)	6
2	Bottom cover	(B)	(6)	6
3	Front panel	(C), (D)	(2), (4)	6, 7
4	Main P.C.B.	(E)	(5)	8
5	Mechanism	(F)	(4)	8

ADJUSTMENTS

Before measuring and adjusting "Overall frequency response", "Overall distortion" and "Overall S/N ratio", confirm that the characteristics of 5 items below are within standard which have much relation to or influence on electrical performances above.

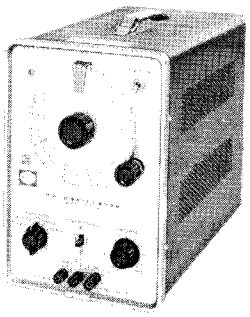
1. Head azimuth adjustment. 2. Bias current. 3. Playback gain. 4. Overall gain.
5. Playback frequency response.

I. TEST INSTRUMENTS

1. Prepare test instruments which are equivalent in accuracy to those shown below.
2. The test instruments should be inspected and corrected by specialists once every 6 months, because a long period of use without maintenance may increase errors in indication.
3. Warm-up the test instruments for 30 minutes and the set to be measured for 10 minutes before taking the measurements. If not, there may arise an error or difference between the initial value and the stabilized value measured after "aging".
4. Specifications of test instruments.

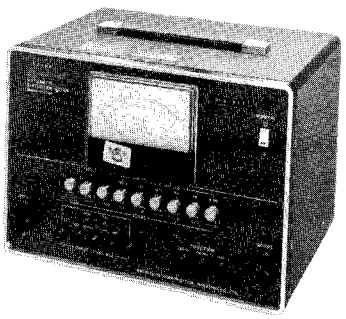
(1) Audio frequency oscillator

a. Oscillation froquency:	5 Hz ~ 500 kHz (5 ranges)
b. Frequency tolerance:	±(3% + 1 Hz)
c. Sine wave	
* Output voltage (at 25°C):	5 Vrms ±10% (without load)
	2.5 Vrms ±10% (with 600Ω load)
* Output frequency response:	Within ±0.2 dB, 20 Hz ~ 20 kHz
	Within ±0.5 dB, 5 Hz ~ 500 kHz
* Distortion factor:	Not more than 0.05%, 200 Hz ~ 20 kHz
	Not more than 0.5%, 5 Hz ~ 500 kHz
* Output impedance:	600Ω unbalanced, within ±15%
* Output attenuator:	0 dB, 20 dB, Error: within ±0.2 dB
d. Temperature in use of set:	Temperature = 0 ~ 40°C, Humidity = 90% or less



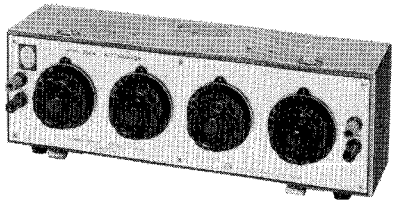
(2) Automatic-stop distortion meter (with vacuum tube voltmeter)

A. Distortion factor measurement	
a. Frequency (fundamental wave):	400 Hz, 1 kHz ±10%
b. Measurement:	0.1 ~ 100% (6 ranges)
c. Input:	50 mV ~ 50 V
d. Fundamental wave attenuation:	60 dB or more
B. Level measurement	
a. Measurement:	1 mV (−60 dB) ~ 30 V (30 dB) (9 ranges)
b. Frequency response (1 kHz basis):	20 Hz ~ 100 kHz ±0.3 dB
c. Input impedance:	1 MΩ ±10%, less than 50 pF
d. Error in indicated value:	Within ±3% at 1 kHz
C. Output terminal	
a. Frequency response:	10 Hz ~ 100 kHz ±1 dB
	100 kHz ~ 1 MHz ±3 dB
b. Output voltage:	1 Vrms ±10% (1 kHz sine wave)



(3) Attenuator

a. Input impedance:	600Ω unbalanced
b. Maximum attenuation:	121 dB
c. Minimum attenuation:	0.1 dB



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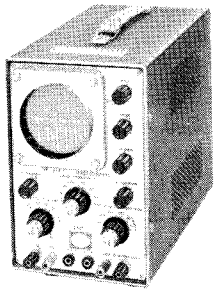
(4) Oscilloscope

a. Cathode ray tube:	Effective ranges 8×8 cm
b. Vertical axis	
* Input sensitivity:	30 mV～30 V/cm
* Frequency band:	DC～2 MHz
* Transient time:	180 ns.
* Input impedance:	1 MΩ, 35 pF
c. Horizontal axis	
* Tuning range:	30 Hz～2 MHz
* Sweep time:	1μs～100 ms/cm
* External sweep:	1 Vp-p/cm or more



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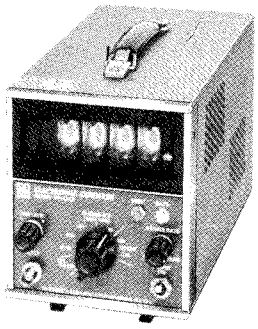
(5) Digital electronic counter

a. Number of figure:	4 (decimal system)
b. Input sensitivity:	100 mVrms
c. Input impedance:	1 MΩ, 40 pF
d. Frequency measurement range:	10 Hz～100 kHz
e. Counting time:	0.1 s, 1 s, 10 s



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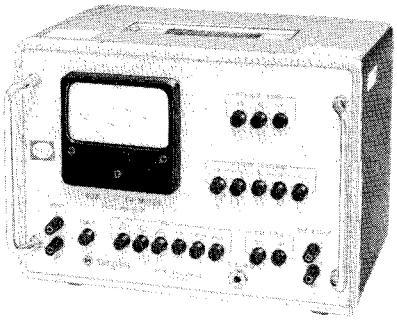
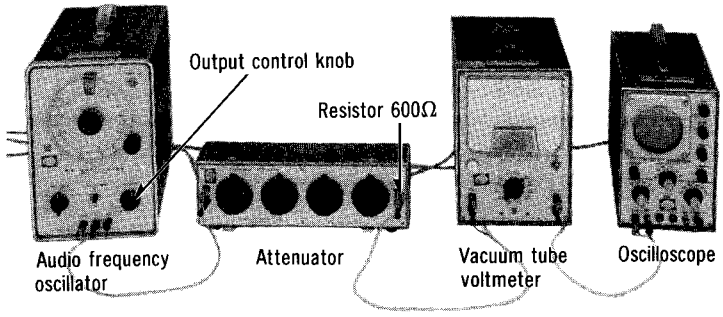
(6) Wow meter

a. Measured center frequency range:	3 kHz ±4%
b. Input level range:	30 mV～3 V
c. Input impedance:	About 50 KΩ unbalanced
d. Measurement:	0.01～3% (5 ranges)
e. Indicator error:	Maximum error in indicated value ±5% in each range
f. Frequency response:	Conforming to weighting curve characteristics (WRMS), JIS C5551. Flat characteristics (RMS) 0.5～200 Hz, within −3 dB (4 Hz basis)
g. Meter indication system:	Effective value indication, conforming to JIS C5551.
h. Meter response characteristics:	About 5～7 sec.
i. Oscillation frequency:	3 frequencies (3 kHz, 3 kHz ±3%)
j. Temperature range:	0～40°C



II. MEASUREMENT CONDITIONS

1. Standard measurement conditions
   * Ambient temperature: 10~30°C (50~86°F)
   * Ambient humidity: 30~90% RH
   * Power voltage accuracy: ±3%
2. Position of tape recorder
   * When measuring, place the unit under test in a horizontal position.
3. Oscillator output voltage adjustment
   * Connect the equipments as shown in the following and adjust the oscillator output control knob for 1 V (f = 1 kHz) through the attenuator while keeping the attenuator at 0 dB.
   * When supplying a signal to the tape recorder amplifier, adjust the input level using the attenuator.



f = 1kHz Output Voltage 1V (0dB)

III. TEST TAPE

Test tape life

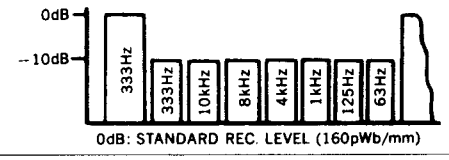
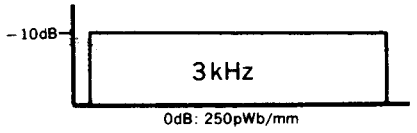
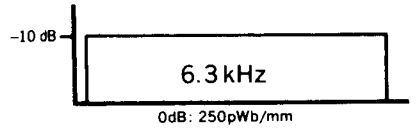
The more frequently the test tape is used, the more the tape characteristics will deteriorate (e.g. lowering of recorded level, worsening of frequency response particularly in high-frequency range, and an increase in wow due to tape elongation) until measured values become unreliable. Even in such a case when a tape is not used, but stored, for a long period of time, tape shows deterioration in performance because of self damagenetization due to storage conditions, etc.

Please refer to the tape life specification and use care not to use a tape longer than its rated life when servicing.

Frequence of use: Not more than 20 times for each tape length.

Storage period: Not more than 6 months.

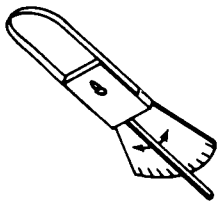
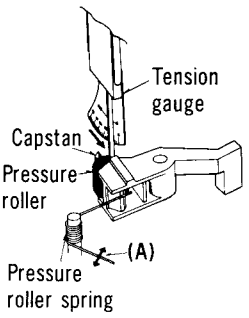
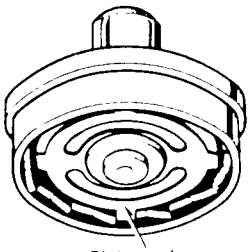
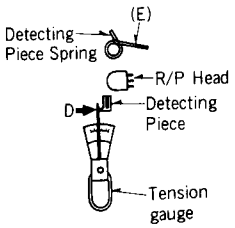
※Test tape

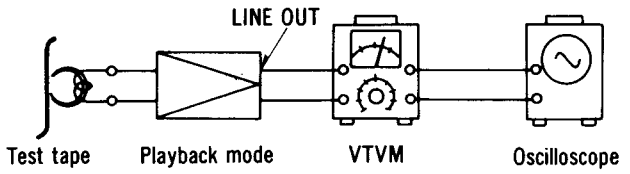
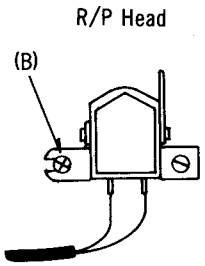
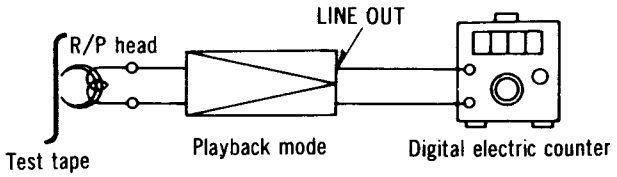
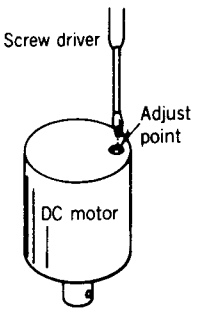
PARTS NO.	PARTS NAME	SPECIFICATIONS	REMARKS
C-FH	Standard recording level and frequency response tape		5 times repetitive recording. Tape speed: 1-7/8 ips. (4.8 cm/s) Full track (10 min.)
C-WAT	Wow and tape speed tape		Tape speed: 1-7/8 ips. (4.8 cm/s) Full track (45 min.)
C-AA	Azimuth tape		Tape speed: 1-7/8 ips. (4.8 cm/s) Full track (15 min.)
C-RA	Reference blank tape (Normal)		Unrecorded tape (20 min.)
C-RF	Reference blank tape (CrO_2)		Unrecorded tape (20 min.)

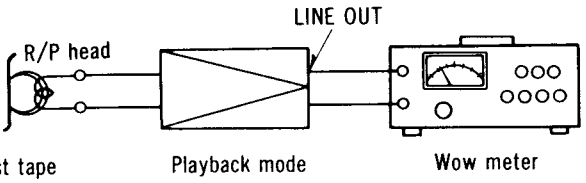
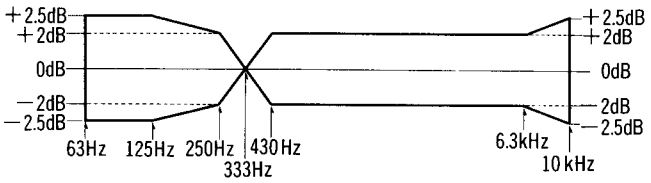
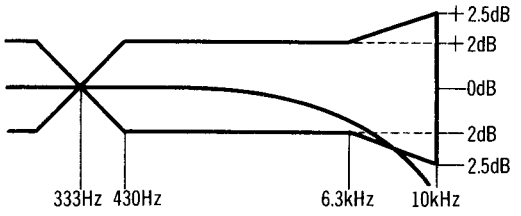
IV. MEASUREMENT & ADJUSTMENT METHOD

NOTE:

1. Make sure heads are clean.
2. Make sure capstan and pressure roller are clean.
3. Judgeable room temperature: 20±5°C (68±9°F)
4. Dolby NR switch: OUT
5. Tape selector: NORMAL

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
Pressure of pressure roller Equipment: * Tension gauge (max. 500 gr) 	1. Place UNIT into playback mode. 2. Hook the tension gauge to pressure roller lever and pull it in the direction of the arrow as shown in fig. 9. 3. Measure the tension at the moment when the pressure roller moves away from the capstan. **Standard value: 400±50 gr** **Adjustment method** Bend the part (A) of the pressure roller spring in either direction shown by the arrow until the correct pressure is attained.	* Playback mode  **Fig. 9**
Takeup tension Equipment: * Cassette torque meter (SRK-CT or RP8063)	1. Mount cassette torque meter on UNIT. 2. Place UNIT into playback mode and read takeup torque. 3. Measure several times and determine the mean value. **Standard value: 50±10 gr-cm** If the measured value is not within standard, firstly clean the rotational parts of the mechanism with alcohol, and if it still is not within standard, make the following adjustment. **Adjustment method** Adjust by turning the plate spring attached in the takeup reel table (See fig. 10).	* Playback mode  **Fig. 10**
Auto-Stop detecting piece tension Equipment: * Tension gauge (max. 100 gr)	1. Place UNIT into playback mode. 2. Press part (D) of the detecting piece in a straight line in the direction of the arrow as shown in fig. 11. **Standard value: 50±10 gr** **Adjustment method** Adjust by bending the part (E) of the detecting piece spring.	* Playback mode  **Fig. 11**

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
Head azimuth adjustment Equipment: * VTVM * Oscilloscope * Test tape (azimuth) ··· C-AA	**Record/playback head adjustment** 1. Test equipment connection is shown below.  **Fig. 12** 2. Play azimuth tape (C-AA 6.3 kHz). 3. Adjust record/playback head angle adjustment screw (B) in fig. 13 so that output level at LINE OUT becomes maximum. 4. Measure both channels, and adjust levels for equal output. 5. After adjustment lock head adjustment screw with lacquer.	* Playback mode  **Fig. 13**
Tape speed Equipment: * Digital electronic counter or frequency counter (RP8067) * Test tape ··· C-WAT	**Tape speed accuracy** 1. Test equipment connection is shown below.  **Fig. 14** 2. Play test tape (C-WAT 3,000 Hz), and supply playback signal to frequency counter. 3. Measure this frequency. 4. On the basis of 3,000 Hz, determine value by following formula: $\text{Tape speed accuracy} = \frac{f - 3{,}000}{3{,}000} \times 100\,(\%)$ where, f = measured value 5. Take measurement at middle section of tape. Standard value: ±1.5% **Adjustment method** 1. Play the test tape (middle). 2. Adjust the tape speed adjustment VR shown on page 14 so that frequency becomes 3,000 Hz. **Tape speed fluctuation** Make measurements in same manner as above (beginning, middle and end of tape), and determine difference between maximum and minimum values and calculate as follows: $\text{Tape speed fluctuation} = \frac{f_1 - f_2}{3{,}000} \times 100\,(\%)$ f_1 = maximum value f_2 = minimum value Standard value: 1%	* Playback mode  **Fig. 15**

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
Wow and flutter Equipment: * Wow meter * Test tape ··· C-WAT	1. Test equipment connection is shown below.  **Fig. 16** 2. Use wow test tape (3,000Hz) and measure its playback signal on wow meter. 3. Wow and flutter is expressed in percentage and that measurement an be weighted by JIS network (WRMS). 4. Measure at middle section of test tape. Standard value: 0.10% (WRMS)	* Playback mode
Playback frequency response Equipment: * VTVM * Oscilloscope * Test tape ··· C-FH	1. Test equipment connection is as same as "Head azimuth adjustment" but use the test tape (C-FH) instead of head azimuth tape (See fig. 12). 2. Place UNIT into playback mode. 3. Play frequency response test tape (C-FH). 4. Measure output level at 10kHz, 8kHz, 4kHz, 1kHz, 125Hz and 63Hz and compare output level with standard frequency 333Hz, at LINE OUT. 5. Make measurement for both channels. 6. Make sure that the measured value is within the range specified in the frequency response chart. Playback frequency response chart  **Fig. 17**	* Playback mode
Playback frequency response	Adjustment 1. If the measured value decreases at high frequency range, as shown in fig. 18, P.C.B. connection points (B) should be shorted to increase at high frequency range (See fig. 22 on page 11).  **Fig. 18** The corrected value 4kHz: about +0.2dB 6kHz: about +0.8dB 8kHz: about +1.0dB 10kHz: about +1.5dB	* Playback mode

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS

2. If the measured value increases at high frequency range, as shown in fig. 19, P.C.B. connection points (A) should be unsoldered and connection points (B) should be shorted (See fig. 22 on page 11).

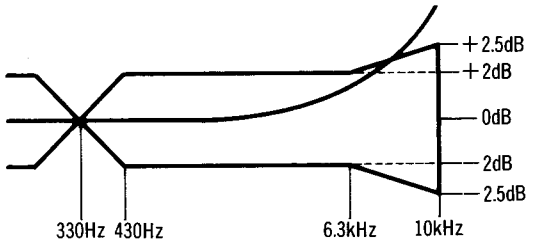


Fig. 19

The corrected value

4kHz	6kHz	8kHz	10kHz
about −0.2dB	about −0.8dB	about −1.0dB	about −1.5dB

Caution:
Please do not unsolder both connection points (A), (B) to prevent oscillation.

3. If the measured value increases at middle frequency range, as shown in fig. 20, P.C.B. connection points (C) should be shorted (See fig. 22 on page 11).

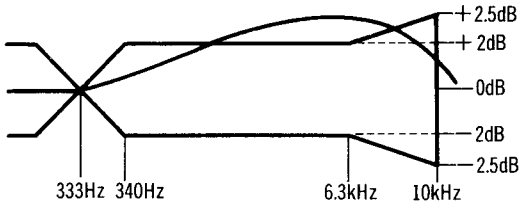


Fig. 20

The corrected value

1kHz	2kHz	4kHz	6kHz
about −0.8dB	about −1.0dB	about −1.4dB	about −1.4dB

4. If the measured value decreases at middle frequency range, as shown in fig. 21, P.C.B. connection points (D) should be unsoldered (See fig. 22 on page 11).

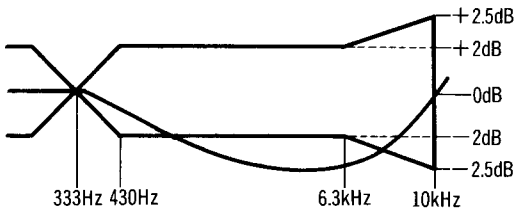


Fig. 21

The corrected value

1kHz	2kHz	4kHz	6kHz
about +0.3dB	about +0.7dB	about +0.8dB	about +0.8dB

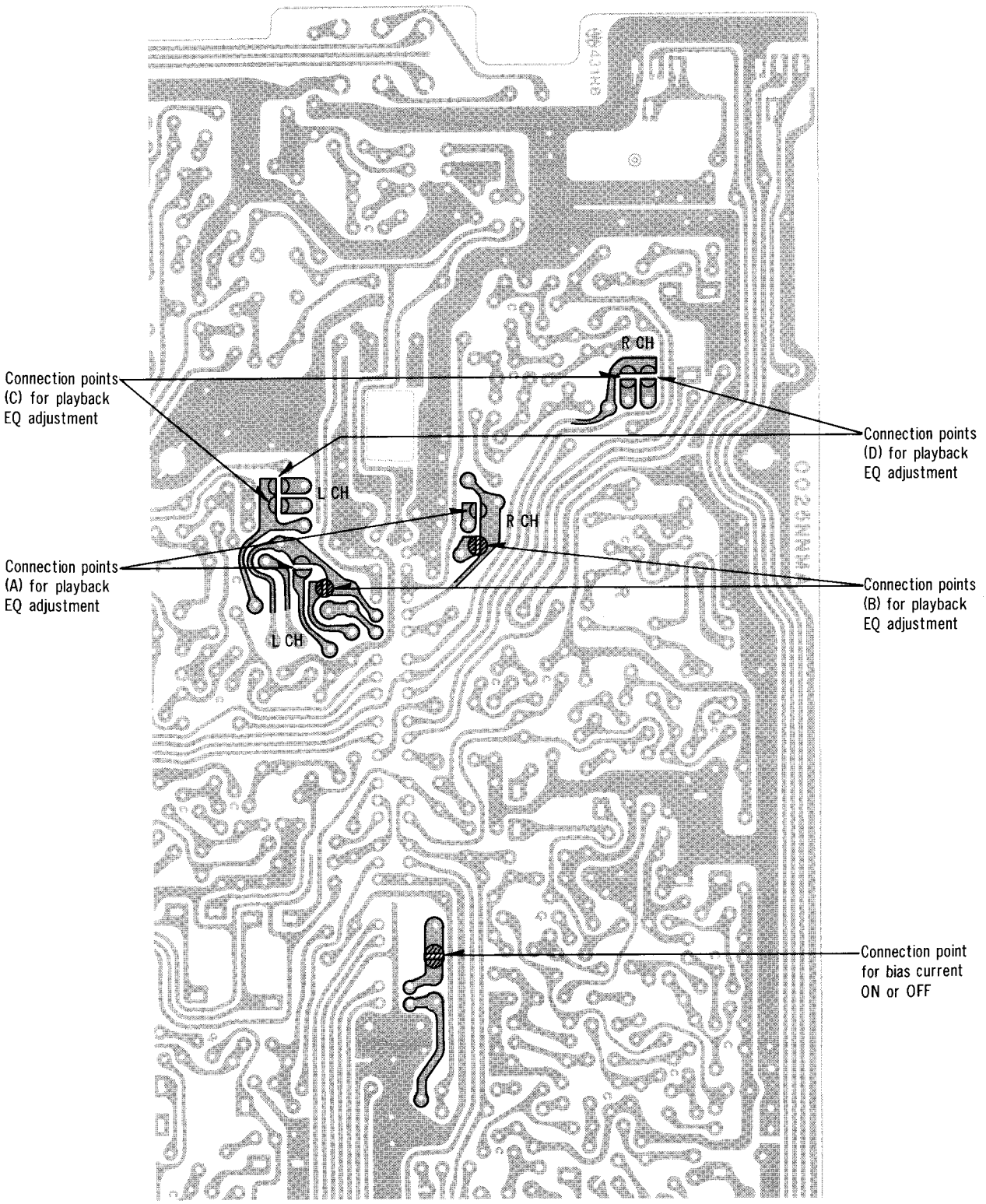
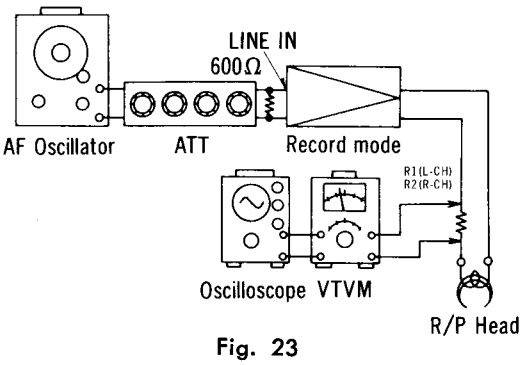
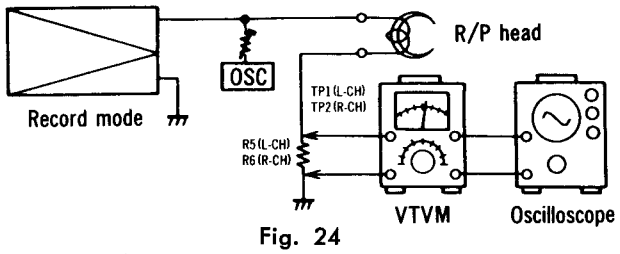
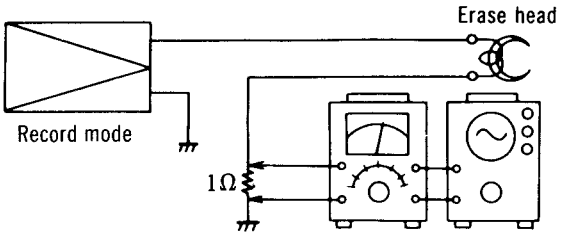
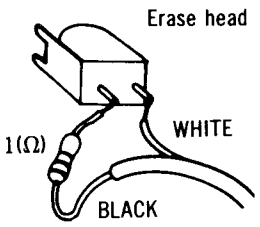
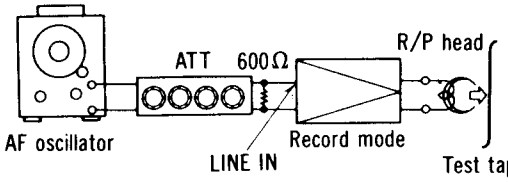
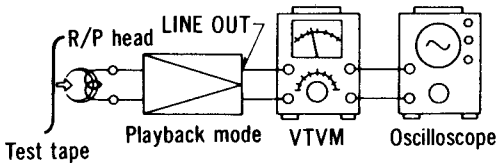
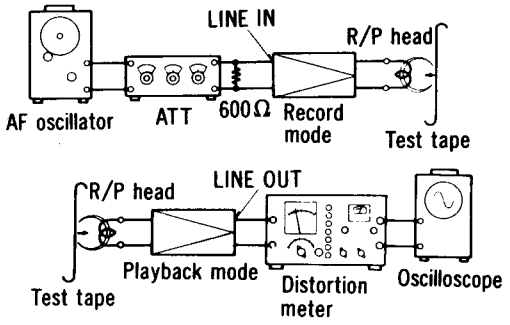
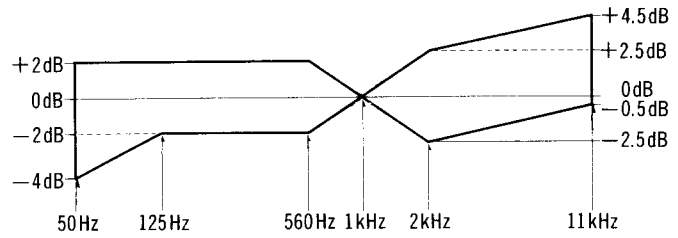
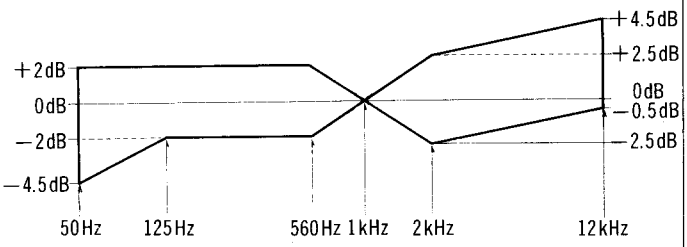
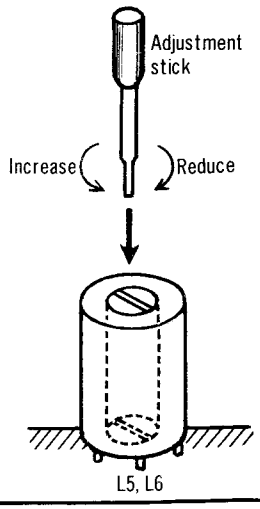

Connection points
(C) for playback
EQ adjustment
R CH
Connection points
(D) for playback
EQ adjustment
L CH
R CH
Connection points
(A) for playback
EQ adjustment
Connection points
(B) for playback
EQ adjustment
L CH
Connection point
for bias current
ON or OFF

Fig. 22

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
Playback gain Equipment: * VTVM * Oscilloscope * Test tape··· C-FH	1. Test equipment connection is shown in fig. 12. 2. Play standard recording level portion on test tape (C-FH 333 Hz), and using VTVM measure the output level at LINE OUT jack. 3. Make measurement for both channels. **Standard value: 0.42 V (−7dB)** **Adjustment** 1. If measured value is not standard, adjust VR1 (L-CH), VR2 (R-CH) (See fig. 36 on page 18). 2. After adjustment, check "Playback frequency response" again.	* Playback mode
Playback S/N ratio Equipment: * VTVM * Oscilloscope * Test tape··· C-FH * Empty cassette	1. Test equipment connection is shown in fig. 12. 2. Play standard recording level test tape (C-FH 333 Hz) and read output level on VTVM. Refer to "Playback gain adjustment". 3. Place empty cassette (which has been cut) and play again. 4. Measure noise level at this time using VTVM, and determine ratio of this level to test tape output signal voltage (333 Hz). **Standard value: Greater than 43 dB** An example calculation is shown below. A: Es = playback output signal voltage of test tape (333 Hz) B: En = playback output noise level Es = 0.42 V (−7 dB) En = 0.003 V (−50 dB) $S/N\ ratio = \frac{Es}{En} = \frac{0.42\,V}{0.003\,V} = 140$ $20 \log_{10} 140 = 43\,dB$ S/N ratio = Es(dB) − En(dB) = −7 − (−50) = 43 dB	* Playback mode
Recording current	 **Fig. 23** 1. Test equipment connection is shown in fig. 23. 2. Stop bias oscillation by unsoldering the connection point for bias current ON or OFF in fig. 22. 3. Supply 1 kHz signal (−24 dB) again and adjust ATT until monitor level at LINE OUT becomes 0.42 V. 4. Measure voltage and then calculate recording current by formura given below. $Recording\ current = \frac{Value\ read\ on\ VTVM\ (V)}{10\ (\Omega)}$ **Standard value:** **0.42 mV: 42μA (Normal)** **0.44 mV: 44μA (EX)** **0.60 mV: 60μA (CrO_2)** 5. Adjust VR11 (L-CH), VR12 (R-CH) (See adjustment part location on page 18).	

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
Bias current Equipment: * VTVM * Oscilloscope	1. Test equipment connection is shown below.  **Fig. 24** 2. Place UNIT into record mode, and tape selector to "NORMAL". 3. Read voltage on VTVM and calculate bias current by following formula: $\text{Bias current (A)} = \frac{\text{Value read on VTVM (V)}}{10\ (\Omega)}$ **Standard value:** $500^{+250\mu A}_{-150\mu A}$ (Normal, EX) $600^{+250\mu A}_{-150\mu A}$ (CrO_2) 4. Adjust L5 (L-CH) and L6 (R-CH) (See adjustment part location on page 14). 5. Then changing the tape selector to "CrO_2", confirm that bias current become greater by 25% than that for normal.	* Record mode * Be sure the ground end of the meter is connected to the ground end of the resistor. * When bias current is the adjusted on one channel only, note that bias current on the other channel may vary. * When L5 or L6 is the replaced, preset core position to bottom side of coil and then readjust optimum bias current.
Erase current Equipment: * VTVM * Oscilloscope * Resistor (0.1Ω)	1. Connect 0.1Ω resistor between ground side terminal of erase head ground lead wire removed (See fig. 26). 2. Connect VTVM to both ends of 0.1Ω resistor.  **Fig. 25** 3. Place UNIT into record mode, and measure voltage across the 0.1Ω resistor. 4. Determine erase current with the following formula: $\text{Erase current (A)} = \frac{\text{Voltage across both ends of } 0.1\Omega}{0.1\Omega}$ **Standard value:** 190 ± 35 mA (Normal, EX) 100 ± 40 mA (CrO_2)	* Record mode  **Fig. 26**
Overall gain Equipment: * AF oscillator * VTVM * ATT * Oscilloscope * Test tape (reference blank tape) ··· C-RA for Normal ··· C-RF for CrO_2	1. Test equipment connection is shown in fig. 27.  	* Record/playback mode * LINE IN level control ··· MAX * Standard input level: MIC ····· −70 ± 3 dB LINE IN −24 ± 3 dB DIN ····· −36 ± 3 dB

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
	 **Fig. 27** 2. Place UNIT into record mode, and tape selector to "NORMAL". 3. Supply 1 kHz signal (−24 dB) from AF oscillator, through ATT, to LINE IN. 4. Adjust ATT until monitor level at LINE OUT becomes 0.42 V (−7 dB). 5. Using test tape (C-RA), make recording. 6. Playback recorded tape, and make sure the value at LINE OUT on VTVM becomes 0.42 V. 7. If measured value is not 0.42 V, adjust VR11 (L-CH), VR12 (R-CH) (See fig. 36 on page 18). 8. Repeat from step (2). 9. For CrO_2 tape selector to "CrO_2", change test tape to (C-RF), and take the same steps for normal.	
Overall distortion Equipment: * Distortion meter * AF oscillator * ATT * Oscilloscope * Test tape ··· C-RA (reference blank tape)	1. Test equipment connection is shown in fig. 28.  **Fig. 28** 2. Supply 1 kHz signal to LINE IN and adjust ATT so that output level at LINE OUT indicates 0.42 V (−7 dB). 3. Make recording. 4. Playback and measure distortion factor of output signal. 5. When the distortion factor does not satisfy the standard, check the bias current. When the bias current is lower than standard, distortion will increase. Care should be exercised in the adjustment because the bias current also has an influence on the overall frequency response. Refer to "The overall frequency response" and "The bias current adjustment". **Standard value:** **Less than 2.3% (Normal)** **Less than 3.3% (EX)** **Less than 3.3% (CrO_2)**	* LINE IN level control ··· MAX

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
Overall frequency response Equipment: * VTVM * AF oscillator * ATT * Test tape (reference blank tape) ··· C-RA for Normal ··· C-RF for CrO_2	**Note:** Before measuring, and adjusting, make sure of the playback frequency response (For the method of measurement, please refer to the playback frequency response). 1. Test equipment connection is shown in fig. 27. 2. Load reference blank test tape and place UNIT into record mode. 3. Supply 1kHz signal from AF oscillator through ATT to LINE IN. 4. Adjust ATT so that input level is −20dB below standard recording level (standard recording level=0VU). 5. At this time, LINE OUT level indicates 0.042V. 6. Record each frequency 50Hz, 120Hz, 560Hz, 1kHz, 2kHz, 3kHz, 10kHz and 11kHz (12kHz for CrO_2 and EX) at the same level. 7. Playback and express in dB the difference between playback output level of each frequency based on playback output level of 1kHz. 8. Make sure that the measured value is within the range specified in the overall frequency response chart. **Overall frequency response chart (Normal)**  **Fig. 29** 9. Set the tape selector to CrO_2 or EX. 10. Measure as same as manner above. 11. Make sure that the measured value is within the range specified in the overall frequency response chart for CrO_2 and EX tape below. **Overall frequency response chart (CrO_2 and EX)**  **Fig. 30**	* Record/playback mode * Record level control ··· MAX
Overall frequency response (As a standard for adjustment)	**Adjustment—Using bias current** 1. When the frequency response between the middle and high frequency range becomes higher than the standard value, as shown by the solid line in fig. 31, increase the bias current by turning L5 (L-CH) or L6 (R-CH) in direction of counter-clockwise (↺). 2. When it becomes lower, as shown by dotted line, reduce the bias current by turning in direction of clockwise (↻).	

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS

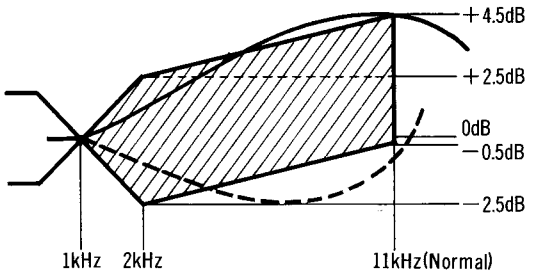


Fig. 31

Adjustment—for overall frequency response of CrO_2 and Fe-Cr tape

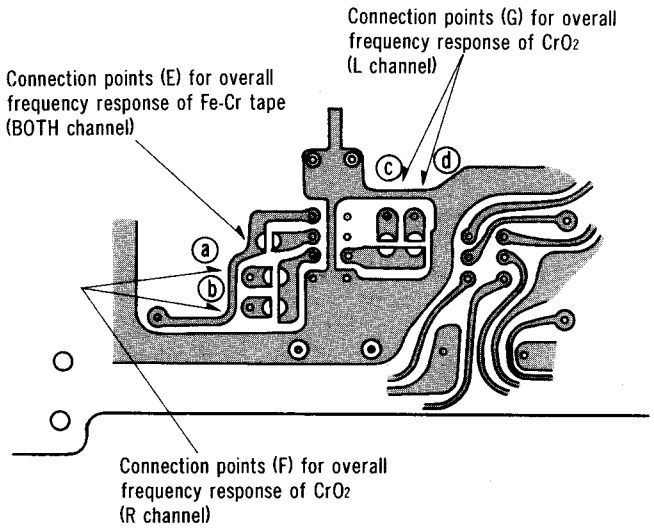

Connection points (G) for overall frequency response of CrO2 (L channel)
Connection points (E) for overall frequency response of Fe-Cr tape (BOTH channel)
a
b
c
d
Connection points (F) for overall frequency response of CrO2 (R channel)

Fig. 32

Adjustment for Fe-Cr tape

If measured value decreases at middle and high frequency range by "Fe-Cr" tape as shown in fig. 33, P.C.B. connection points (E) should be shorted (See fig. 32).
Bias current is increased about 10 percent which is the same as the bias current for "NORMAL" tape.

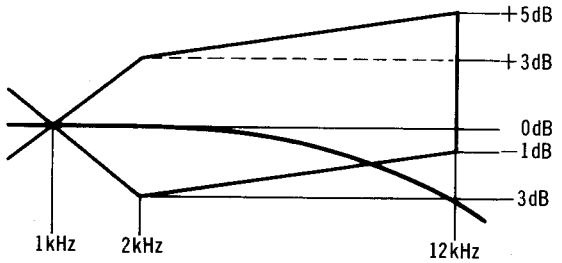


Fig. 33

The corrected value

50Hz	100Hz	1kHz	4kHz	8kHz	10kHz	12kHz	14kHz
about −0.5dB	about −1.0dB	about −0.2dB	about +1.0dB	about +2.0dB	about +2.2dB	about +2.2dB	about +2.2dB

Note:

① This adjustment is for both channel.

② Low frequency range will be decreased.

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
	Adjustment for CrO_2 tape If measured value decreases at middle and high frequency range by "CrO_2" tape, this adjustment can be taken by 2 methods as follows. 1. Adjustment for slightly increasing the frequency response If measured value decreases slightly at middle and high frequency range by "CrO_2" tape as shown in fig. 34, P.C.B. connection points (ⓐ or ⓑ for F, R-CH, ⓒ or ⓓ for G, L-CH) should be shorted to increases high frequency range for recording equalizer amplifier (See fig. 32).	**Note:** ① This adjustment can be done for each channel. ② Low frequency range won't be varied.

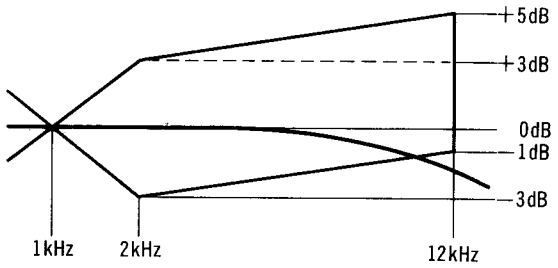


Fig. 34

The corrected value

1kHz	4kHz	8kHz	10kHz	12kHz	14kHz
about 0dB	about +0.4dB	about +0.8dB	about +1.0dB	about +1.0dB	about +0.3dB

2. Adjustment for extremely increasing the frequency response
If measured value decreases extremely at middle and high frequency range by "CrO_2" tape as shown in fig. 35, P.C.B. connection points (ⓐ and ⓑ for F, R-CH, ⓒ and ⓓ for G, L-CH) should be shorted (See fig. 32).

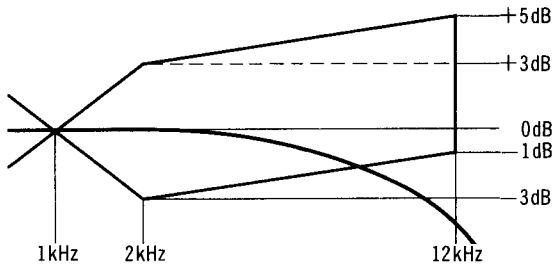


Fig. 35

The corrected value

1kHz	4kHz	8kHz	10kHz	12kHz	14kHz
about 0dB	about +1.5dB	about +2.0dB	about +2.0dB	about +2.0dB	about +1.0dB

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
Overall S/N ratio Equipment: * VTVM * AF oscillator * ATT * Oscilloscope * Test tape ··· C-RA (reference blank tape)	1. Test equipment connection is shown in fig. 27. 2. Supply 1 kHz signal to LINE IN and adjust ATT so that output level at LINE OUT indicates 0.42 V (−7 dB). 3. Make recording. 4. Make another recording without supplying signal (disconnect input plug to LINE IN). 5. Rewind to recorded part and playback. 6. Measure output signal level and no signal level (noise), and determine the ratio in decibels (dB). 7. The value is difference between "Playback S/N and overall S/N", but for decibel calculation refer to "Playback S/N measurement" on page 12. **Standard value: Greater than 42 dB (without NAB filter)**	* Record/playback mode * LINE IN level control ··· MAX * Erase the tape with a bulk tape eraser.
Level meter Equipment: * VTVM * Oscilloscope * AF oscillator	1. Supply 1 kHz signal (−24 dB) from AF oscillator, through ATT, to LINE IN jack. 2. Place UNIT into record mode. 3. Adjust ATT until monitor level at LINE OUT becomes 0.42 V. 4. Adjust VR9 (L-CH), VR10 (R-CH) so that VU meter indicates 0 VU (See adjustment parts location on page 18).	* Record mode
Dolby NR circuit Equipment: * VTVM * AF oscillator * ATT * Oscilloscope	1. Place UNIT into record mode, set the Dolby NR switch to OUT position and supply to LINE IN to obtain −34.5 dB at TP3 (L-CH), TP4 (R-CH) (frequency 5 kHz). 2. Confirm that the value at IN position is 8 dB greater than the value at OUT position of Dolby NR switch. 3. When it is not in condition above, adjust as follows. 4. Set VR5 (L-CH), VR6 (R-CH) to maximum. 5. Set the Dolby NR switch to IN position. 6. At this time adjust VR7 (L-CH), VR8 (R-CH) so that the reading of VTVM become 10 dB greater than the value in step (1) above. 7. Adjusting VR5 (L-CH), VR6 (R-CH), make the reading of VTVM become 2 dB smaller than the value obtainted through the adjustment a in step (6) above.	* Record mode * LINE IN level control ··· MAX * Stop the bias oscillation by unsoldering point (A) shown in adjustment parts location on page 11.

ADJUSTMENT PARTS LOCATION

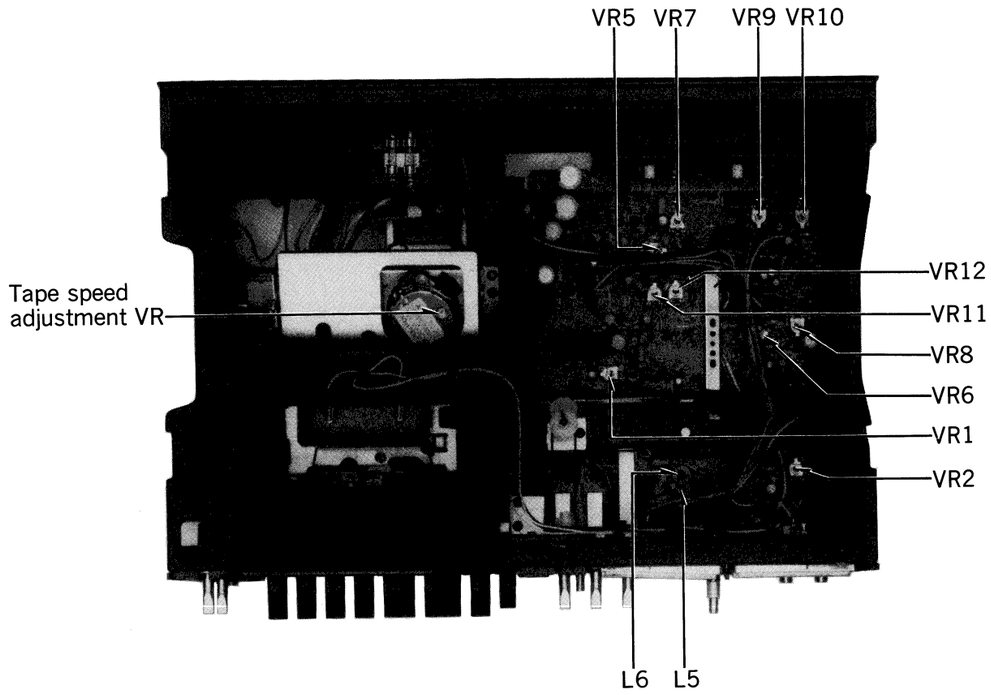
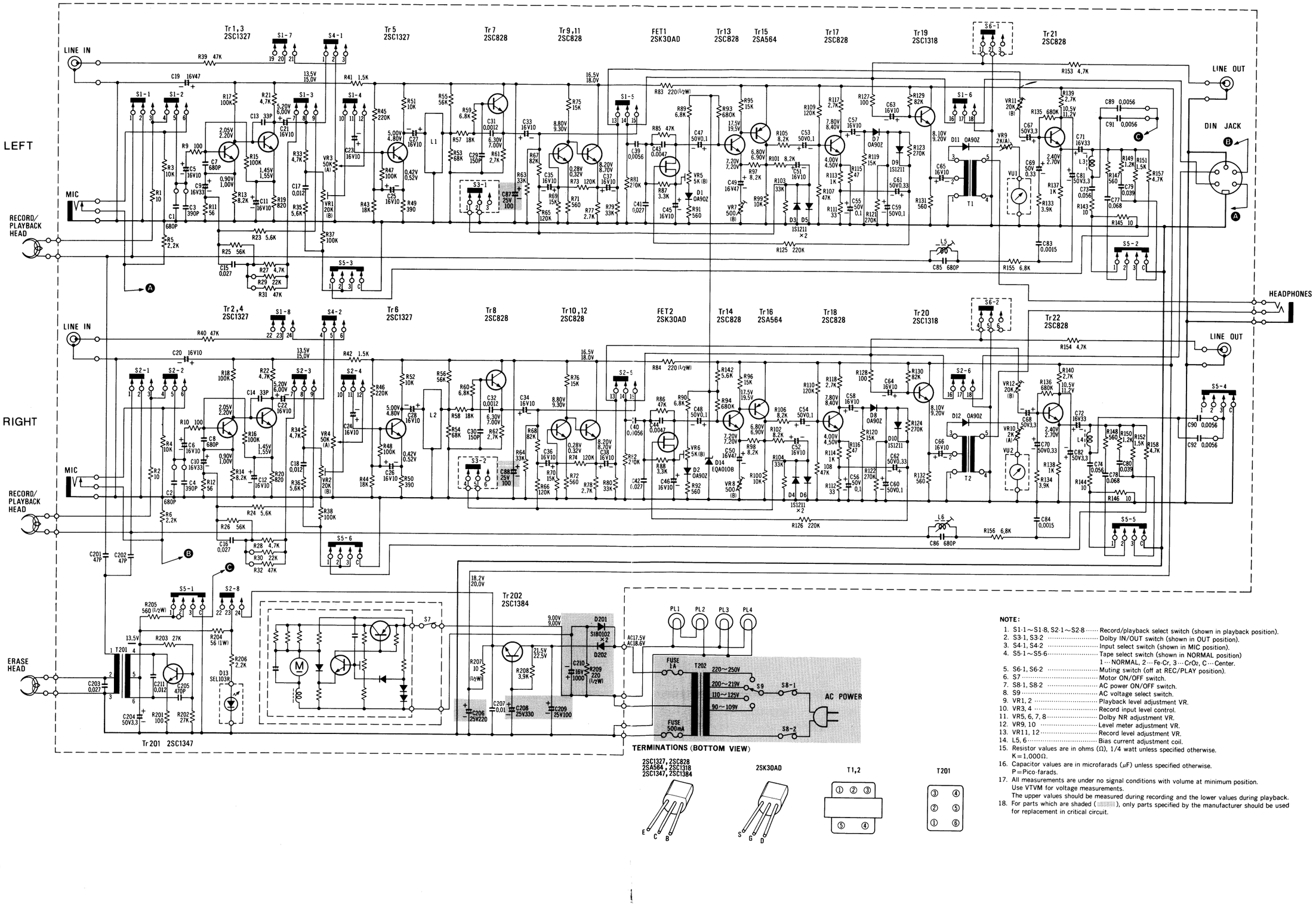


Fig. 36

※ Dolby is the trade mark of Dolby Laboratories Inc.

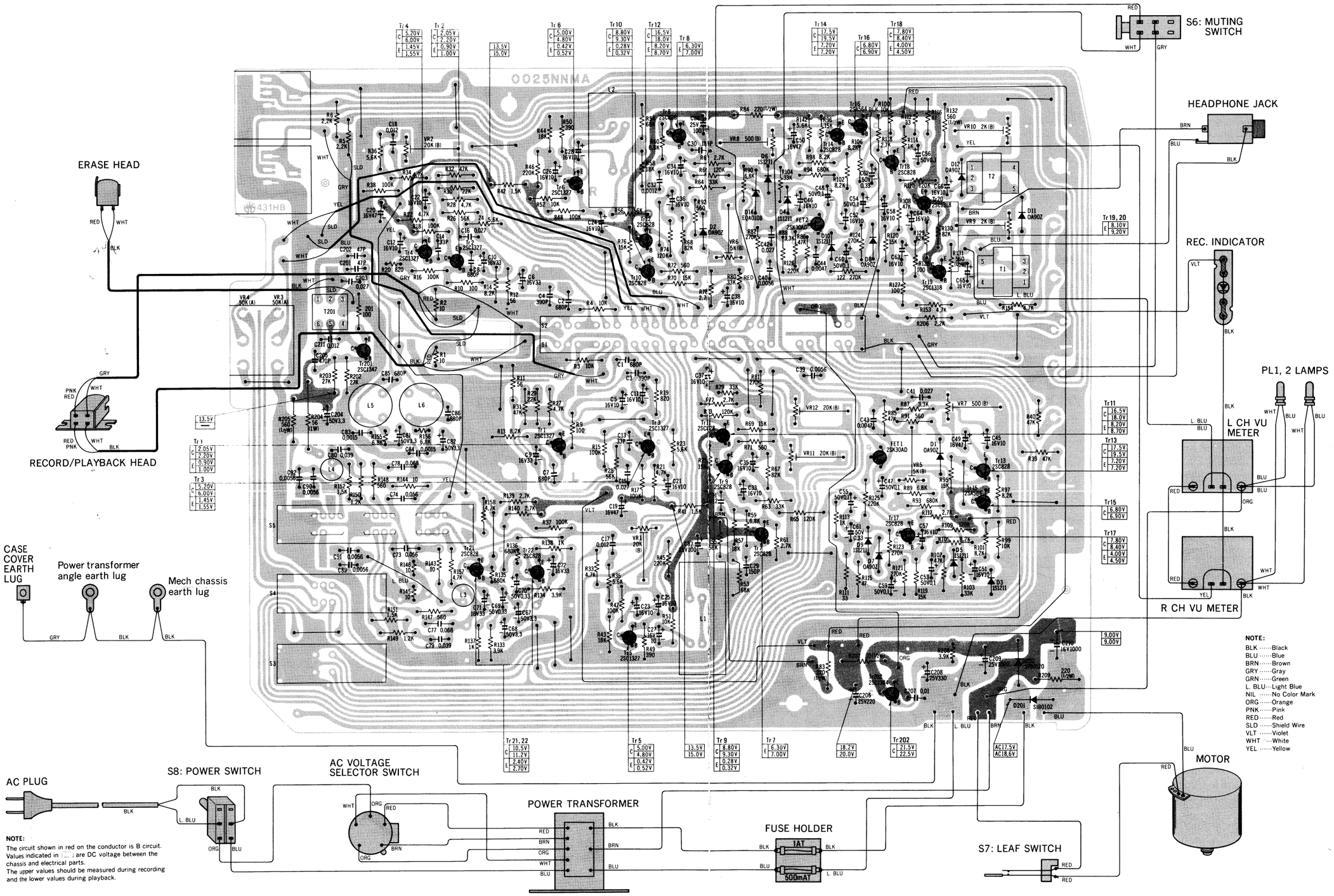
SCHEMATIC DIAGRAM MODEL RS-615US-D



NOTE:

1. S1-1～S1-8, S2-1～S2-8 ..... Record/playback select switch (shown in playback position).
2. S3-1, S3-2 ..... Dolby IN/OUT switch (shown in OUT position).
3. S4-1, S4-2 ..... Input select switch (shown in MIC position).
4. S5-1～S5-6 ..... Tape select switch (shown in NORMAL position)
   1 ··· NORMAL, 2 ··· Fe-Cr, 3 ··· CrO_2, C ··· Center.
5. S6-1, S6-2 ..... Muting switch (off at REC/PLAY position).
6. S7 ..... Motor ON/OFF switch.
7. S8-1, S8-2 ..... AC power ON/OFF switch.
8. S9 ..... AC voltage select switch.
9. VR1, 2 ..... Playback level adjustment VR.
10. VR3, 4 ..... Record input level control.
11. VR5, 6, 7, 8 ..... Dolby NR adjustment VR.
12. VR9, 10 ..... Level meter adjustment VR.
13. VR11, 12 ..... Record level adjustment VR.
14. L5, 6 ..... Bias current adjustment coil.
15. Resistor values are in ohms (Ω), 1/4 watt unless specified otherwise.
    K=1,000Ω.
16. Capacitor values are in microfarads (μF) unless specified otherwise.
    P=Pico farads.
17. All measurements are under no signal conditions with volume at minimum position.
    Use VTVM for voltage measurements.
    The upper values should be measured during recording and the lower values during playback.
18. For parts which are shaded ( ), only parts specified by the manufacturer should be used for replacement in critical circuit.

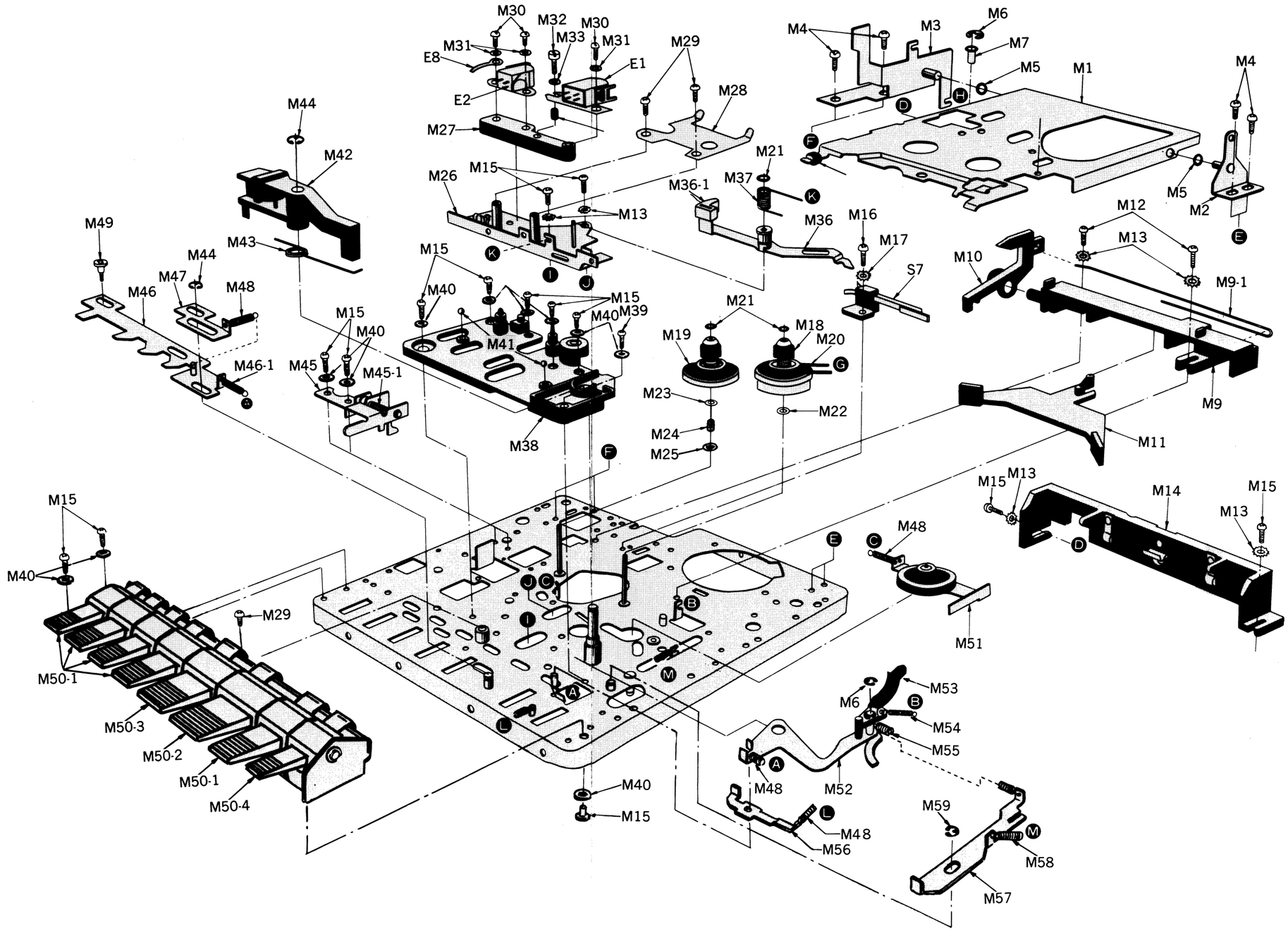
WIRING CONNECTION DIAGRAM MODEL RS-615US-D

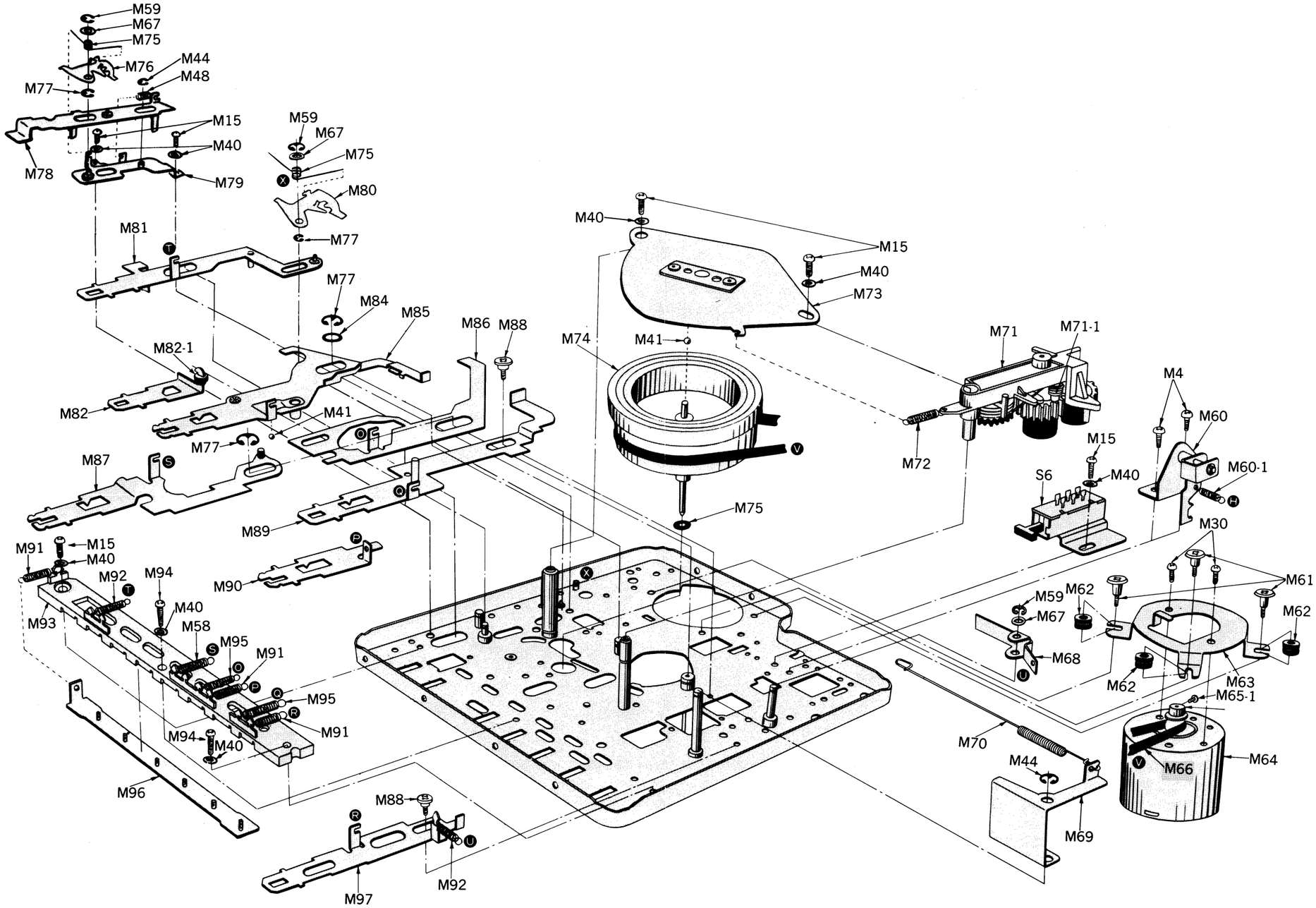


NOTE:
The circuit shown in red on the conductor is B circuit.
Values indicated in [ ] are DC voltage between the chassis and electrical parts.
The upper values should be measured during recording and the lower values during playback.

NOTE:
BLK ·····Black
BLU ·····Blue
BRN·····Brown
GRY·····Gray
GRN·····Green
L. BLU···Light Blue
NIL ·····No Color Mark
ORG·····Orange
PNK·····Pink
RED·····Red
SLD·····Shield Wire
VLT·····Violet
WHT ····White
YEL·····Yellow

EXPLODED VIEWS




M59
M67
M75
M76
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M77
M15
M40
M78
M79
M59
M67
M75
M80
M81
M77
M77
M84
M85
M82-1
M82
M41
M77
M87
M89
M90
M86
M88
M74
M41
M75
M40
M15
M40
M73
M71
M71-1
M72
M4
M60
M60-1
M15
S6
M40
M30
M61
M62
M59
M67
M68
M62
M62
M63
M65-1
M64
M66
M70
M44
M69
M91
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M94
M40
M93
M58
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M40
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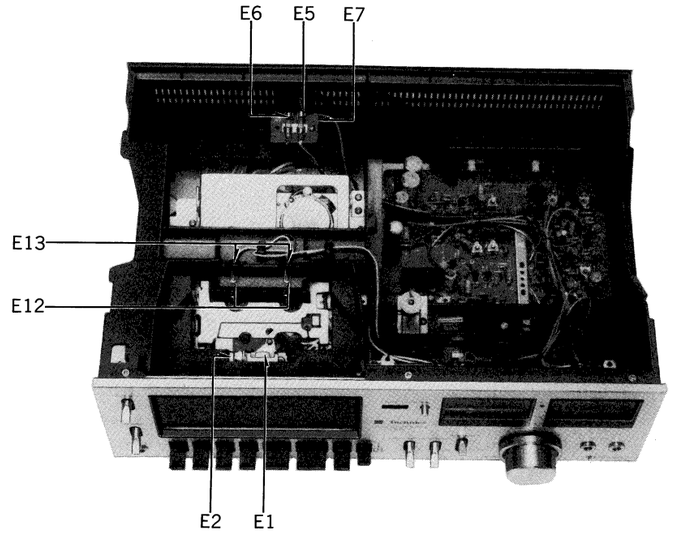
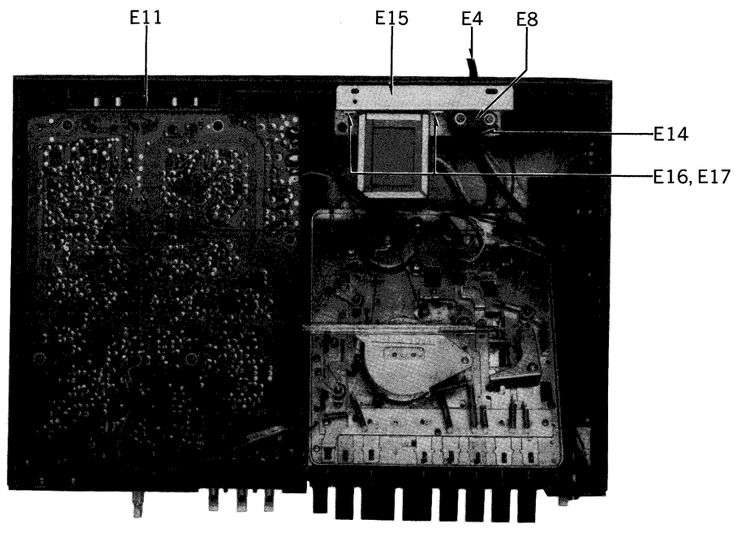
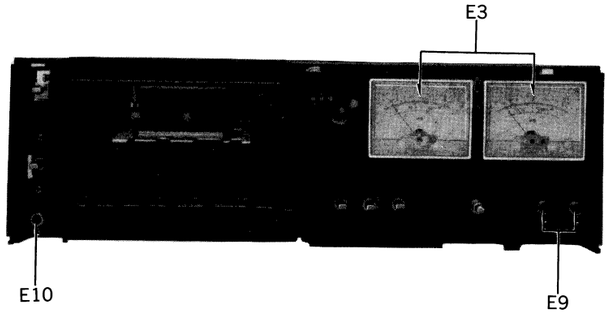
M92
M97

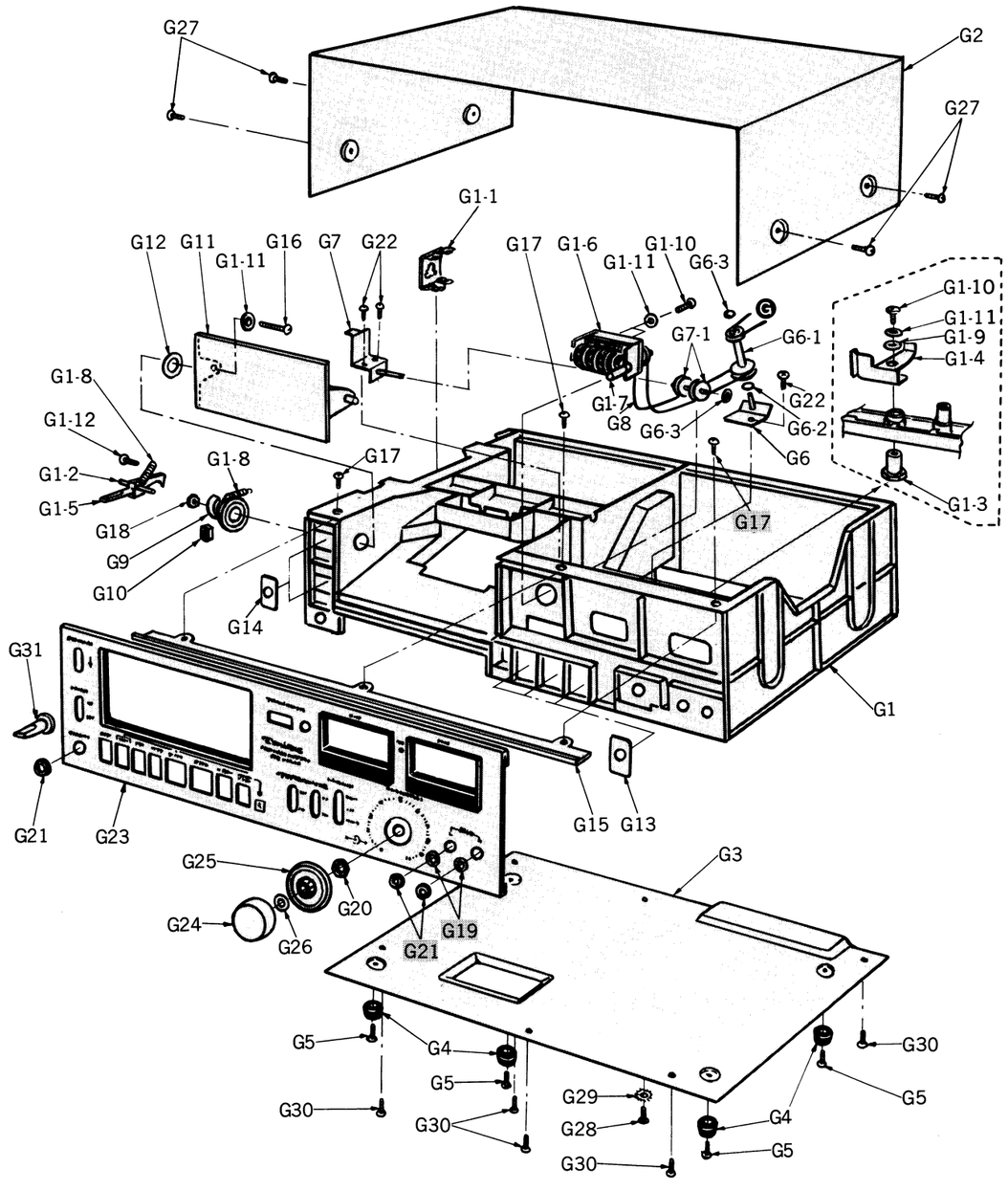
ELECTRICAL PARTS LOCATION







CABINET PARTS



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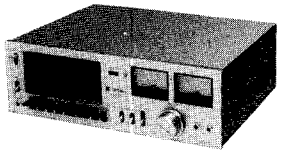
REPLACEMENT PARTS LIST

MODEL RS-615US-D

National Panasonic



RS-615US-D

NOTE:

1. Be sure to make your orders of replacement parts according to this list.
2. "Ⓝ" in "Remarks" column indicates new parts.
3. For parts which are shaded ( ), only parts specified by the manufacturer should be used for replacement in critical circuit.

NOTA:

1. Habrá que asegurarse que los pedidos de piezas de repuesto se hagan según esta lista.
2. "Ⓝ" marcado en la columna "Remarks", quiere decir que las piezas son nuevas.
3. Para las partes de la lista que están sombreadas ( ), deben ser usadas para hacer el reemplazo en los circuitos críticos solamente las partes que están especificadas por el productor.

NOTE:

1. Bien s'assutet de se conformer à la liste suivante pour les commandes de pièces de rechange.
2. "Ⓝ", dans la colonne "Remarks", indique les pièces nouvelles.
3. Concernant les pièces dans les parties hachurées ( ), doivent être remplacées dans les circuits critiques uniquement par des pièces spécifiées par le fabricant.

HIENWEIS:

1. Bestellen Sie Ihre Ersatzteile genau nach dieser Liste.
2. "Ⓝ" in der "Remarks" Spalte bedeutet "neue Teile".
3. Für diejenigen Positionen in der Ersatzteil-Liste, die auf schraffiertem Untergrund ( ) gedruckt sind, dürfen nur vom Hersteller zugelassenene Fabrikate als Ersatzteile in den kritischen Schaltkreisen verwendet werden.

按：

1. 關於代用零件之訂購，務請依照此表而行之爲荷。
2. 「備考」(Remarks)一欄中之 "Ⓝ" 形符號標記表示該零件爲新出品。
3. 印有灰色( ) 的標號表示，祇有那些由製造公司所指定及證明的零件，才能用來代換。

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
		MECHANICAL PARTS		
M1	QXK1713	Cassette Base Plate Assembly	1	RS-630USD
M2	QXA0292	Cassette Base Plate Holding Angle-A	1	〃
M3	QXA0465	Cassette Base Plate Holding Angle-B	1	〃
M4	XTN3+8B	Tapping Screw ⊕3×8	6	COMMON
M5	QBW2019	Washer	2	RS-630USD
M6	XUC25FT	Stop Ring 2.5φ	2	COMMON
M7	QDP1595	Roller	1	RS-630USD
M8	QBG1132	Cushion Rubber	1	〃
M9	QXT0004	Brake Holder	1	〃
M9-1	QBN1486	Brake Spring	1	〃
M10	QBJ1975B	Erase Safety Lever-B	1	〃
M11	QBJ1941A	Brake	1	〃
M12	XSN26+8	Screw ⊕2.6×8	2	COMMON
M13	XWC26B	Lock Washer	6	〃
M14	QXZ0044	Cassette Retainer Assembly	1	RS-630USD
M15	XSN26+6	Screw ⊕2.6×6	18	COMMON
M16	XSN2+5	Screw ⊕2×5	1	〃
M17	XWC2B	Lock Washer	1	〃
M18	QXD0050	Takeup Reel Table Assembly	1	RS-630USD
M19	QXD0034	Supply Reel Table Assembly	1	〃
M20	QDB0215	Counter Belt	1	RS-671USD
M21	QWQ1124	Snap Washer	2	RS-630USD
M22	QBJ3220	Washer	1	〃
M23	QBW2013	〃	1	〃
M24	QBC1272	Back Tension Spring	1	〃
M25	QBW2012	Washer	1	〃
M27	QXK1717	Head Base Plate Assembly	1	〃
M27	QBJ2087A	Head Spacer	1	〃
M28	QMF1814	Cassette Holder	1	〃
M29	XSN26+3	Screw ⊕2.6×3	5	COMMON
M30	XSN2+12	Screw ⊕2×12	3	〃
M31	XWA2B	Spring Washer	3	〃
M32	QHQ1199A	Head Adjustment Screw	1	RS-630USD

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
M33	XWE2	Flat Washer	1	COMMON
M35	QBC1103A	Head Spring	1	RS-630USD
M36	QXL1048	Auto-Stop Detecting Lever Assembly	1	Ⓝ
M36-1	QBJ1538A	Auto-Stop Detecting Piece	1	RS-630USD
M37	QBN1390	Detecting Lever Spring	1	〃
M38	QXK1716	Upper Base Plate Assembly	1	〃
M39	XSN26+10	Screw ⊕2.6×10	1	COMMON
M40	XWA26B	Spring Washer	17	〃
M41	QDK1012	Steel Ball 2.5φ	4	RS-630USD
M42	QXLM010	Pressure Roller Assembly	1	〃
M43	QBN1389	Pressure Roller Spring	1	〃
M44	XUC3FT	Stop Ring 3φ	4	COMMON
M45	QXL0991	Up Lever Assembly	1	RS-630USD
M45-1	QBN1485	Up Lever Spring	1	〃
M46	QXR0179	Operation Rod Assembly	1	〃
M47	QMR1411	Operation Rod-C	1	〃
M48	QBT1558M	Idler Spring	3	〃
M49	QHQ1169	Step Screw	1	〃
M50	QXB0438	Push Button Assembly	1	Ⓝ
M50-1	QGO1303	Push Button	5	Ⓝ
M50-2	QGO1304	Stop Button	1	Ⓝ
M50-3	QGO1305	Playback Button	1	Ⓝ
M50-4	QGO1306	Timmer Button	1	Ⓝ
M51	QXLM008	Idler Assembly	1	RS-630USD
M52	QXL1046	Auto-Stop Driving Lever Assembly	1	Ⓝ
M53	QML3061	Auto-Stop Driving Pawl	1	Ⓝ
M54	QBT1489M	Auto-Stop Spring	1	RS-630USD
M55	QBT1822M	Eject Lever Spring	1	Ⓝ
M56	QML3057	Timmer Lever-A	1	Ⓝ
M57	QML3058	Timmer Lever-B	1	Ⓝ
M58	QBT1536DMA	Playback Lever Spring	1	RS-630USD
M59	XUC2FT	Stop Ring 2φ	3	COMMON
M60	QXL0990	Click Lever Assembly	1	RS-630USD
M60-1	QBT1817	Click Lever Spring	1	〃
M61	QMS1833	Step Screw	3	Ⓝ

RS-615US-D

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
M62	QBG1055A	Motor Rubber Cushion	3	RS-630USD
M63	QMA1952A	Motor Angle	1	〃
M64	QDM0980XPAB	Motor	1	〃
M65	QXP0494	Motor Pulley Assembly	1	〃
M65-1	XSN2+3	Screw ⊕2×3	1	COMMON
M66	QDB0141	Capstan Belt	1	RS-630USD
M67	QBK7121	Fiber Washer	3	Ⓝ
M68	QML2712A	Eject Operation Lever	1	RS-630USD
M69	QML2950	Record/Playback Lever	1	〃
M70	QBT1818	Record/Playback Spring	1	〃
M71	QXG1014E	Fast Wind Lever Assembly	1	〃
M71-1	QBN1447A	Gear Lever Spring	1	〃
M72	QBT1485M	Fast Forward Lever Spring	1	〃
M73	QXH0095A	Flywheel Retainer	1	〃
M74	QXF0115	Flywheel	1	〃
M75	QBJ3221	Washer	1	〃
M76	QBK7121	Fiber Washer	2	〃
M77	XUC5FT	Stop Ring 5φ	4	COMMON
M78	QXL1044	Timmer Lever-C	1	Ⓝ
M79	QXA0547	Timmer Angle Assembly	1	Ⓝ
M80	QML2379B	Lock Lever	1	RS-630USD
M81	QXR0268	Pause Rod	1	Ⓝ
M82	QXR0241	Stop Rod Assembly	1	RS-630USD
M82-1	QBG1497A	Brake Rubber	1	〃
M84	QBK7130A	Fiber Washer	1	Ⓝ
M85	QXRM0002A	Playback Rod Assembly	1	RS-630USD
M86	QMR1307A	Playback Rod-B	1	〃
M87	QXR0002B	Fast Forward Rod Assembly	1	〃
M88	QHQ1168	Step Screw	2	〃
M89	QXL0828	Record Lever Assembly	1	〃
M90	QML1953A	Rewind Lever	1	〃
M91	QBT1580M	Stop Lever Spring	3	〃
M92	QBT1604M	Eject Lever Spring-C	2	〃
M93	QGG0050A	Lever Guide	1	〃
M94	XSN26+10	Screw ⊕2.6×10	2	COMMON

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
M95	QBT1486DM	Record Lever Spring	1	RS-630USD
M96	QXH0227	Push Button Lock Plate	1	RS-640USD
M97	QMR1446	Eject Rod	1	RS-630USD
M98	XUC4FT	Stop Ring 4φ	1	COMMON
		RESISTORS		
R1, 2	ERD25TJ100	Carbon Resistor 10Ω 1/4W	2	
R3, 4	ERD25TJ103	〃 10KΩ 1/4W	2	
R5, 6	ERD25TJ222	〃 2.2KΩ 1/4W	2	
R9, 10	ERD25TJ101	〃 100Ω 1/4W	2	
R11, 12	ERD25TJ560	〃 56Ω 1/4W	2	
R13, 14	ERD25TJ822	〃 8.2KΩ 1/4W	2	
R15, 16	ERD25TJ104	〃 100KΩ 1/4W	2	
R17, 18	ERD18TSJ104	〃 100KΩ 1/4W	2	
R19, 20	ERD25TJ821	〃 820Ω 1/4W	2	
R21, 22	ERD25TJ472	〃 4.7KΩ 1/4W	2	
R23, 24	ERD25TJ562	〃 5.6KΩ 1/4W	2	
R25, 26	ERD25TJ563	〃 56KΩ 1/4W	2	
R27, 28	ERD25TJ472	〃 4.7KΩ 1/4W	2	
R29, 30	ERD25TJ223	〃 22KΩ 1/4W	2	
R31, 32	ERD25TJ473	〃 47KΩ 1/4W	2	
R33, 34	ERD25TJ472	〃 4.7KΩ 1/4W	2	
R35, 36	ERD25TJ562	〃 5.6KΩ 1/4W	2	
R37, 38	ERD25TJ104	〃 100KΩ 1/4W	2	
R39, 40	ERD25TJ473	〃 47KΩ 1/4W	2	
R41, 42	ERD25TJ152	〃 1.5KΩ 1/4W	2	
R43, 44	ERD25TJ183	〃 18KΩ 1/4W	2	
R45, 46	ERD25TJ224	〃 220KΩ 1/4W	2	
R47, 48	ERD25TJ104	〃 100KΩ 1/4W	2	
R49, 50	ERD25TJ399	〃 390Ω 1/4W	2	
R51, 52	ERD25TJ103	〃 10KΩ 1/4W	2	
R53, 54	ERD25TJ683	〃 68KΩ 1/4W	2	
R55, 56	ERD25TJ563	〃 56KΩ 1/4W	2	
R57, 58	ERD25TJ183	〃 18KΩ 1/4W	2	
R59, 60	ERD25TJ682	〃 6.8KΩ 1/4W	2	

RS-615US-D

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
R61, 62	ERD25TJ272	Carbon Resistor 2.7KΩ 1/4W	2	
R63, 64	ERD25TJ333	〃 33KΩ 1/4W	2	
R65, 66	ERD25TJ124	〃 120KΩ 1/4W	2	
R67, 68	ERD25TJ823	〃 82KΩ 1/4W	2	
R69, 70	ERD25TJ153	〃 15KΩ 1/4W	2	
R71, 72	ERD25TJ561	〃 560Ω 1/4W	2	
R73, 74	ERD25TJ124	〃 120KΩ 1/4W	2	
R75, 76	ERD25TJ153	〃 15KΩ 1/4W	2	
R77, 78	ERD25TJ272	〃 2.7KΩ 1/4W	2	
R79, 80	ERD25TJ333	〃 33KΩ 1/4W	2	
R81, 82	ERD25TJ274	〃 270KΩ 1/4W	2	
R83, 84	ERD50TJ221	〃 220Ω 1/2W	2	
R85, 86	ERD25TJ473	〃 47KΩ 1/4W	1	
R87, 88	ERD25TJ332	〃 3.3KΩ 1/4W	2	
R89, 90	ERD25TJ682	〃 6.8KΩ 1/4W	2	
R91, 92	ERD25TJ561	〃 560Ω 1/4W	2	
R93, 94	ERD25TJ684	〃 680KΩ 1/4W	2	
R95, 96	ERD25TJ153	〃 15KΩ 1/4W	2	
R97, 98	ERD25TJ822	〃 8.2KΩ 1/4W	2	
R99, 100	ERD25TJ103	〃 10KΩ 1/4W	2	
R101, 102	ERD25TJ822	〃 8.2KΩ 1/4W	2	
R103, 104	ERD25TJ333	〃 33KΩ 1/4W	2	
R105, 106	ERD25TJ822	〃 8.2KΩ 1/4W	2	
R107, 108	ERD25TJ473	〃 47KΩ 1/4W	2	
R109, 110	ERD25TJ124	〃 120KΩ 1/4W	2	
R111, 112	ERD25TJ330	〃 33Ω 1/4W	2	
R113, 114	ERD25TJ102	〃 1KΩ 1/4W	2	
R115, 116	ERD25TJ470	〃 47Ω 1/4W	2	
R117, 118	ERD25TJ272	〃 2.7KΩ 1/4W	2	
R119, 120	ERD25TJ153	〃 15KΩ 1/4W	2	
R121, 122, 123, 124				
	ERD25TJ274	〃 270KΩ 1/4W	4	
R125, 126	ERD25TJ224	〃 220KΩ 1/4W	2	
R127, 128	ERD25TJ101	〃 100Ω 1/4W	2	
R129, 130	ERD25TJ823	〃 82KΩ 1/4W	2	

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
R131, 132	ERD50TJ561	Carbon Resistor 560Ω 1/2W	2	
R133, 134	ERD25TJ392	〃 3.9KΩ 1/4W	2	
R135, 136	ERD25TJ684	〃 680KΩ 1/4W	2	
R137, 138	ERD25TJ102	〃 1KΩ 1/4W	2	
R139, 140	ERD25TJ272	〃 2.7KΩ 1/4W	2	
R142	ERD25TJ562	〃 5.6KΩ 1/4W	1	
R143, 144, 145, 146				
	ERD25TJ100	〃 10Ω 1/4W	4	
R147, 148	ERD25TJ561	〃 560Ω 1/4W	2	
R149, 150	ERD25TJ122	〃 1.2KΩ 1/4W	2	
R151, 152	ERD25TJ152	〃 1.5KΩ 1/4W	2	
R153, 154	ERD25TJ472	〃 4.7KΩ 1/4W	2	
R155, 156	ERD25TJ682	〃 6.8KΩ 1/4W	2	
R157, 158	ERD25TJ472	〃 4.7KΩ 1/4W	2	
R201	ERD25TJ101	〃 100Ω 1/4W	1	
R202, 203	ERD25TJ273	〃 27KΩ 1/4W	2	
R204	ERG1ANJ560	Metal-oxide Resistor 56Ω 1W	1	
R205	ERD50TJ561	Carbon Resistor 560Ω 1/2W	1	
R206	ERD25TJ222	〃 2.2KΩ 1/4W	1	
R207	ERD50TJ100	〃 10Ω 1/2W	1	
R208	ERD25TJ392	〃 3.9KΩ 1/4W	1	
R209	ERD50TJ221	〃 220Ω 1/2W	1	
		VARIABLE RESISTORS		
VR1, 2	EVLS3AA00B24	Semi-fixed Variable Resistor 20KΩ (B)	2	RS-630USD
VR3, 4	EWF15AF30A54	Variable Resistor 50KΩ (A)	1	Ⓝ
VR5, 6	EVLS3AA00B53	Semi-fixed Variable Resistor 5KΩ (B)	2	RS-630USD
VR7, 8	EVLS3AA00B52	〃 500Ω (B)	2	〃
VR9, 10	EVLS3AA00B23	〃 2KΩ (B)	2	RS-640USD
VR11, 12	EVLS3AA00B24	〃 20KΩ (B)	2	〃
		CAPACITORS		
C1, 2	ECKD1H681KB	Ceramic Capacitor 680pF	2	
C3, 4	ECKD1H391KB	〃 390pF	2	
C5, 6	ECEA16V10	Electrolytic Capacitor 10μF	2	

RS-615US-D

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
C7, 8	ECKD1H681KB	Ceramic Capacitor 680pF	2	
C9, 10	ECEA16V33	Electrolytic Capacitor 33μF	2	
C11, 12	ECEA16V10	〃 10μF	2	
C13, 14	ECCD1H330K	Ceramic Capacitor 33pF	2	
C15, 16	ECQM05273KZ	Mylar Capacitor 0.027μF	2	
C17, 18	ECQM05123KZ	〃 0.012μF	2	
C19, 20	ECEA16V47	Electrolytic Capacitor 47μF	2	
C21, 22, 23, 24, 25, 26, 27, 28				
	ECEA16V10	〃 10μF	8	
C29, 30	ECCD1H151K	Ceramic Capacitor 150pF	2	
C31, 32	ECKD1H122KB	〃 0.0012μF	2	
C33, 34, 35, 36, 37, 38				
	ECEA16V10	Electrolytic Capacitor 10μF	6	
C39, 40	ECQM05562JZ	Mylar Capacitor 0.0056μF	2	
C41, 42	ECQM05273JZ	〃 0.027μF	2	
C43, 44	ECQM05472JZ	〃 0.0047μF	2	
C45, 46	ECEA16V10	Electrolytic Capacitor 10μF	2	
C47, 48	ECEA50MR1	〃 0.1μF	2	
C49, 50	ECEA16V47	〃 47μF	2	
C51, 52	ECEA16V10	〃 10μF	2	
C53, 54, 55, 56	ECEA50ZR1	〃 0.1μF	4	
C57, 58	ECEA16V10	〃 10μF	2	
C59, 60	ECEA50ZR1	〃 0.1μF	2	
C61, 62	ECEA50ZR33	〃 0.33μF	2	
C63, 64, 65, 66	ECEA16V10	〃 10μF	4	
C67, 68	ECEA50V3R3	〃 3.3μF	2	
C69, 70	ECEA50ZR33	〃 0.33μF	2	
C71, 72	ECEA16V33	〃 33μF	2	
C73, 74	ECQM05563KZ	Mylar Capacitor 0.056μF	2	
C77, 78	ECQM05683KZ	〃 0.068μF	2	
C79, 80	ECQM05393KZ	〃 0.039μF	2	
C81, 82	ECEA50V3R3	Electrolytic Capacitor 3.3μF	2	
C83, 84	ECKD1H152KB	Ceramic Capacitor 0.0015μF	2	
C85, 86	ECQS1681KZ	Styrol Capacitor 680	2	
C87, 88	ECEA25V100	Electrolytic Capacitor 100μF	2	

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
C89, 90, 91, 92	ECQM05562KZ	Mylar Capacitor 0.0056μF	4	
C201, 202	ECCD1H470K	Ceramic Capacitor 47pF	2	
C203	ECQM05273KZ	Mylar Capacitor 0.027μF	1	
C204	ECEA50V3R3	Electrolytic Capacitor 3.3μF	1	
C205	ECQS1471KZ	Styrol Capacitor 470pF	1	
C206	ECEA25V220	Electrolytic Capacitor 220μF	1	
C207	ECKD1H103PF	Ceramic Capacitor 0.01μF	1	
C208	ECEA25V330	Electrolytic Capacitor 330μF	1	
C209	ECEA25V1000	〃 1000μF	1	
C210	ECEA16V1000	〃 1000μF	1	
C211	ECQM05123KZ	Mylar Capacitor 0.012μF	1	
		TRANSISTORS		
Tr1, 2, 3, 4, 5, 6	2SC1327	Transistor	6	RS-630USD
Tr7, 8, 9, 10, 11, 12, 13, 14				
	2SC828	〃	8	〃
Tr15, 16	2SA564	〃	2	〃
Tr17, 18	2SC828	〃	2	〃
Tr19, 20	2SC1318	〃	2	〃
Tr21, 22	2SC828	〃	2	〃
Tr201	2SC1347	〃	1	〃
Tr202	2SC1384	〃	1	RS-671USD
FET1, 2	2SK30AD	〃	2	RS-630USD
		DIODES & RECTIFIERS		
D1, 2	OA90Z	Diode	2	RS-630USD
D3, 4, 5, 6	1S1211	〃	4	〃
D7, 8	OA90Z	〃	2	〃
D9, 10	1S1211	〃	2	〃
D11, 12	OA90Z	〃	2	〃
D13	SEL103R	Illuminate Diode	1	〃
D14	EQA0108S	Diode	1	〃
D201, 202	SIB0102	Silicon Rectifier	2	〃

RS-615US-D

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
		TRANSFORMERS		
T1, 2	QLT2D10A	Output Transformer	2	RS-630USD
T201	QLB0158	Oscillator Transformer	1	〃
T202	QLPD22ELE	Power Transformer	1	Ⓝ
		COILS		
L1, 2	QLM9Z002W	MPX Filter Coil	2	RS-630USD
L3, 4	QLQX2421Y	Peaking Coil	2	RS-620USD
L5, 6	QLH2008	Bias Trap Coil	2	RS-273USD
		SWITCHES		
S1, 2	QSS1120	Slide Switch (Record/Playback Selector)	1	RS-630USD
S3, 4	QST2216H	Lever Switch (Dolby Input)	2	Ⓝ
S5	QST6309H	Lever Switch (Tape Selector)	1	Ⓝ
S6	QSS2209T	Slide Switch (Muting)	1	RS-630USD
S7	QSB0169M1	Leaf Switch (Motor ON/OFF)	1	〃
S8	QST2219S	Lever Switch (Power ON/OFF)	1	Ⓝ
S9	QSR1407H	Rotary Switch (Voltage Selector)	1	Ⓝ
		ELECTRICAL PARTS		
E1	QWY4107Z	Record/Playback Head	1	RS-263AUSD
E2	QWY2118	Erase Head	1	RS-630USD
E3	QSL1076RNM	Level Meter	2	Ⓝ
E4	QFC1204	AC Power Cord	1	RS-630USD
E5	XBAQ0003	Fuse 500mAT	1	RS-610USD
E6	XBAQ0004	Fuse 1AT	1	RS-630USD
E7	QTF1020	Fuse Holder	1	RQ-546FLSD
E8	QTD1164	Cord Clamper	2	RS-671USD
E9	QJA0251H	Microphone Jack	2	Ⓝ
E10	QJA0231	Headphone Jack	1	Ⓝ
E11	QEJ5002H	Jack Board Assembly	1	Ⓝ
E12	XAMQ23P400N	Pilot Lamp	2	Ⓝ
E13	QBG1166	Lamp Cover	2	RS-273USD
E14	QTWM0026	Switch Cover	1	Ⓝ

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
E15	QMAM0073	Transformer Angle	1	Ⓝ
E16	QTTM011	Transformer Holder	2	RS-630USD
E17	XTN3+8B	Tapping Screw ⊕3×8	2	COMMON
		CABINET PARTS		
G1	QYMM0028	Main Body Case Assembly	1	Ⓝ
G1-1	QTSM0013	Earth Metal	1	Ⓝ
G1-2	QMS1878	Shaft	1	Ⓝ
G1-3	QMP1603	Record/Playback Pole	1	Ⓝ
G1-4	QMLM0031	Record/Playback Lever	1	RS-630USD
G1-5	QML3115	Lid Lever	1	Ⓝ
G1-6	QXCM0005	Tape Counter	1	RS-630USD
G1-7	QBT1484M	Spring	1	RQ-445FLSD
G1-8	XWG3E10	Washer	1	Ⓝ
G1-9	XSN3+6S	Screw ⊕3×6	3	COMMON
G1-10	XWA3B	Spring Washer	4	〃
G1-11	XTN3+8B	Tapping Screw	1	〃
G2	QGCM0008	Case Cover	1	Ⓝ
G3	QGCM0007	Bottom Cover	1	Ⓝ
G4	QKA1050A	Rubber Foot	4	RS-263AUSD
G5	XSN3+8S	Screw ⊕3×8	4	COMMON
G6	QXPM0003	Connection Pulley Holding Angle	1	Ⓝ
G6-1	QXP0496A	Connection Pulley-A	1	Ⓝ
G6-2	QBJ3220	Washer	1	RS-630USD
G6-3	QWQ1124	Snap Washer	1	〃
G7	QXPM0004	Connection Pulley Holding Metal	1	Ⓝ
G7-1	QDP1628	Connection Pulley-B	2	Ⓝ
G8	QDB0210	Counter Belt-A	1	RS-676USD
G9	QKJM0013	Cassette Lid Holder	1	Ⓝ
G10	QBG1567	Cushion	1	Ⓝ
G11	QKFM0023H	Cassette Lid	1	Ⓝ
G12	QBPM0010	Cassette Lid Spring	1	Ⓝ
G13	QBH2021	Switch Mask-A	3	Ⓝ
G14	QBH2022	Switch Mask-B	2	Ⓝ
G15	QMAM0075	Panel Holding Angle	1	Ⓝ

RS-615US-D

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
G16	XSN3+25S	Screw ⊕3×25	1	COMMON
G17	XSS3+8S	Screw ⊕3×8	3	〃
G18	XNG3	Nut 3φ	1	〃
G19	QTWM0020	Spacer	2	Ⓝ
G20	QNQ1039	Nut (VR)	1	Ⓝ
G21	QNQM0001	Jack Nut	3	Ⓝ
G22	XTN3+10B	Screw ⊕3×10	3	COMMON
G23	QYPM0015	Front Panel Assembly	1	Ⓝ
G24	QYT0428	Volume Knob-A Assembly	1	Ⓝ
G25	QYT0427	Volume Knob-B Assembly	1	Ⓝ
G26	QBJ3299	Washer	1	Ⓝ
G27	XTN4+10B	Screw ⊕4×10	4	COMMON
G28	XTN3+6B	Screw ⊕3×6	1	〃
G29	XWC3B	Lock Washer 3φ	1	〃
G30	XTN35+10B	Screw ⊕3.5×10	5	〃
G31	QGT1350	Lever Knob	1	Ⓝ
		ACCESSORIES		
A1	RP050A	DIN Cord	1	COMMON
A2	QFT6TCJNTBFZ	Cassette Tape	1	RS-630USD
A3	QQT1221	Instruction Book	1	Ⓝ
		PACKINGS		
P1	QPNM0098	Inside Carton	1	Ⓝ
P2	QPAM0017	Inner Cushion	2	Ⓝ
P3	XZB50X60A05	Poly Bag	1	RS-630USD

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